Railway

Engineering and Maintenance

Over 40,000,000 in Service

HEADFREE JOINTS

Less Cost Per Unit Of Strength

HE RAIL JOINT COMPANY Inc.

0 CHURCH ST. NEW YORK 7, N. Y.

NIGHT AND DAY

LABOR SAVERS

Reliance Hy-Pressure Hy-Crome Spring Washers on rail-joint bolts are on the job 24 hours a day, extending the interval between maintenance periods and reducing costs. When a heavy freight pounds along, or a fast express whizzes by over a rail joint, the powerful reactive pressure of Reliance Hy-Pressure Spring Washers is at work offsetting the effects of wear and bolt elongation resulting from stresses and strains developed by heavy wheel loads and high speeds. Round the clock, keep rail joints *tighter—longer* with Reliance Hy-Pressure Hy-Crome Spring Washers.

Edgemark of Quality

Reliance

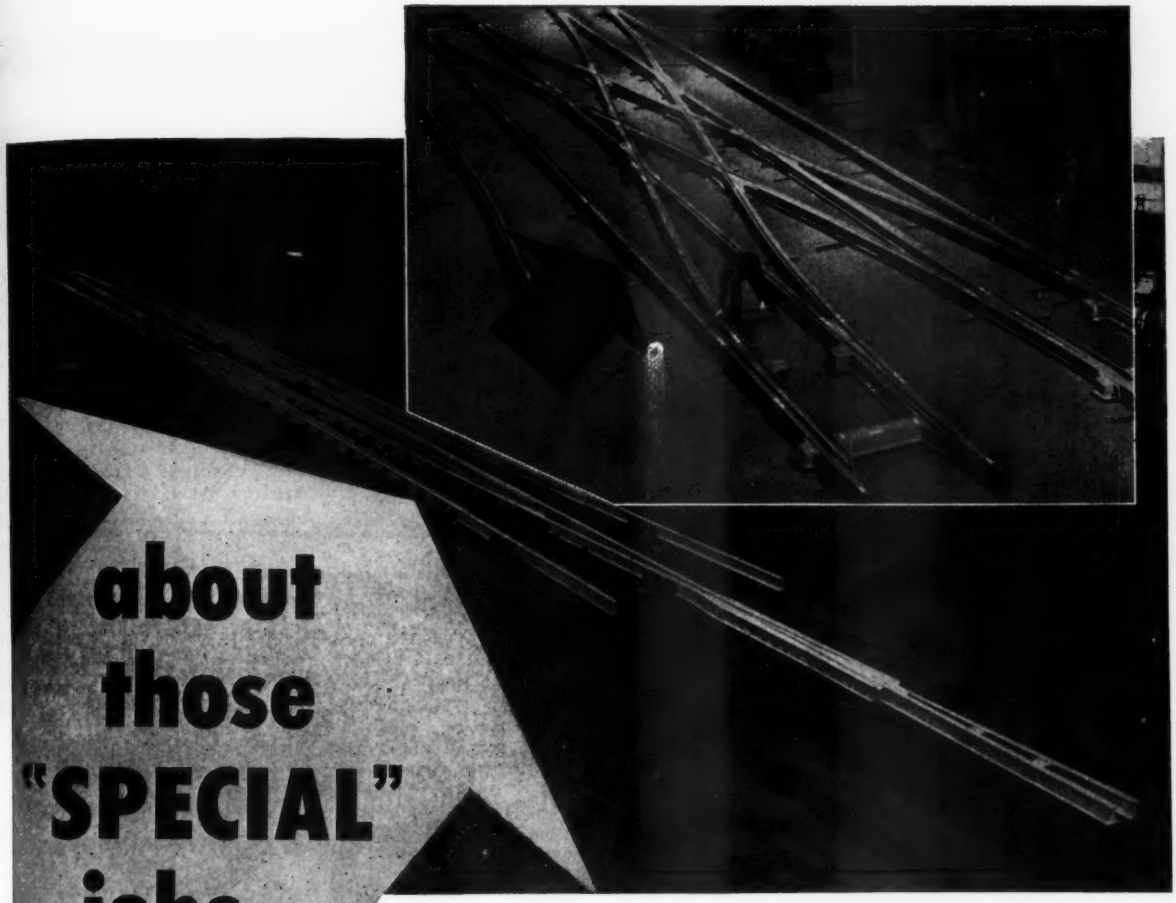
HY-PRESSURE HY-CROME

spring washers

RELIANCE DIVISION
Offices and plant: MASSILLON, OHIO

Sales Offices: New York • Cleveland • Detroit • Chicago • St. Louis • San Francisco • Montreal

EATON
EATON MANUFACTURING COMPANY



about those "SPECIAL" jobs...

Whenever you need something difficult or unusual in the way of track layouts, call Bethlehem. Over the years we've done so much intricate, off-trail work that "specialty" assignments are taken in stride. The tougher the job, the greater the reason for placing it with Bethlehem.

Shown here are two widely different pieces of work that illustrate our point. The slim, graceful No. 20 double-slip crossing was a big job using 152-lb rail. It was for main-line, high-speed track on one of the most heavily-traveled routes in the country. The other layout, only part of which can be shown in a photo, was pier track of a special nature. This job involved unusual problems, all of which were successfully handled by our engineers and shops.

But don't think we're interested solely in king-size orders. We'll be glad to tackle your small work, as well as the big jobs. Also—just a reminder—you can get virtually any type of track accessory from Bethlehem . . . switch stands, braces, guard rails, frog plates, switch heaters, and other items. Make us your first port of call whenever you want track or the things that go with it.

BETHLEHEM STEEL

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

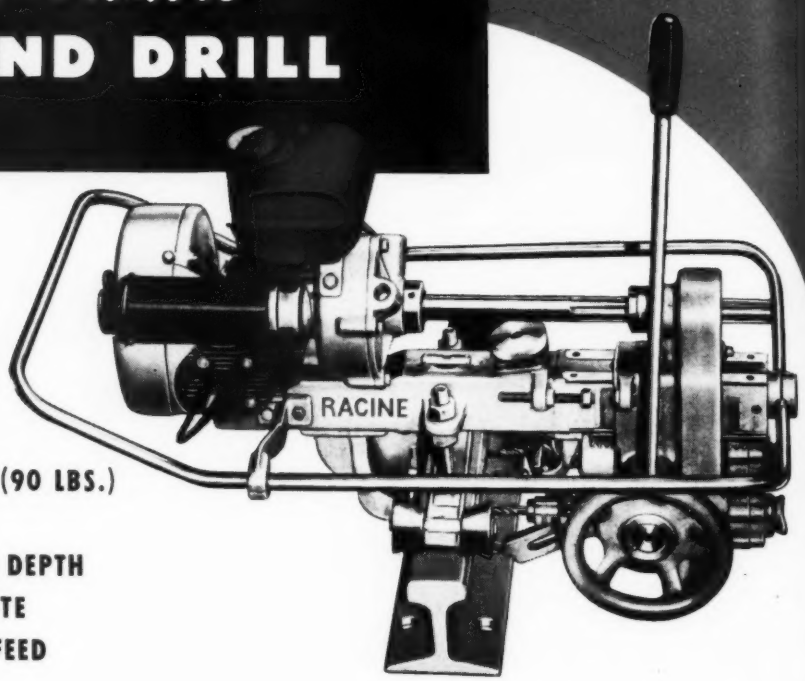
On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation

Export Distributor: Bethlehem Steel Export Corporation

Published monthly by Simmons-Boardman Publishing Corporation 79 W. Monroe St., Chicago 3, Ill. Subscription price: United States and Possessions, and Canada, $2.00 for one year; $3.00 for two years. Single copies 50 cents. Entered as second-class matter January 20, 1933, at the post office at Chicago, Ill., under the act of March 3, 1879, with additional entry at Marion, Ind., post office. Address communications to 79 W. Monroe St., Chicago 3, Ill. Volume 46, No. 5.

YOUR **EXTRA EMPLOYEE** THAT WORKS WITHOUT PAY

RACINE
Portable
BOND DRILL



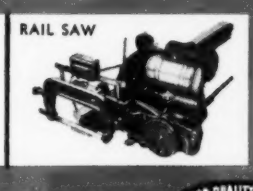
- LIGHT IN WEIGHT (90 LBS.)
- TWIN SPINDLES
- CONTROLLED HOLE DEPTH
- FAST AND ACCURATE
- LEVER AND RACK FEED

A RACINE gas engine powered Portable Bond Drill does the work of several men. It frees man power for other jobs. An "extra employee" in every way but pay.

The RACINE Bond Drill is actually a rugged, accurate drill press built on horizontal lines. Readily rolled along or lifted by one man. Quickly clamped in position for drilling straight round holes. Easily removed to clear the track for traffic.

An adjustable gauge sets depth of drilling. Lever and rack feed enable the operator to maintain steady hole production, effortlessly. Simple, fast and accurate, this machine helps you to meet today's demand for more work — with less men — at lower cost. Write for complete 3-color catalog.

OTHER PORTABLE MACHINES BY RACINE



RACINE TOOL AND MACHINE COMPANY
1738 State Street • Racine, Wis.

STANDARD FOR QUALITY AND PRECISION · RACINE · RACINE TOOL and MACHINE CO.

For additional information, use postcard, pages 439-440

There is *no money made* on traveling to the job!

A Northwest Truck Crane operating as a dragline building fill for a siding.

Getting to the job is time lost! Northwest Truck Cranes mean more working hours on the job and quicker completion.

Northwest brings you a Truck Crane that is far ahead of the ordinary unit. The "Feather-Touch" Clutch Control gives ease of operation with the *feel of the load* without delicate mechanism. Uniform Pressure Swing Clutches give smooth engagement, freedom from constant adjustment and absolute control of the swing.

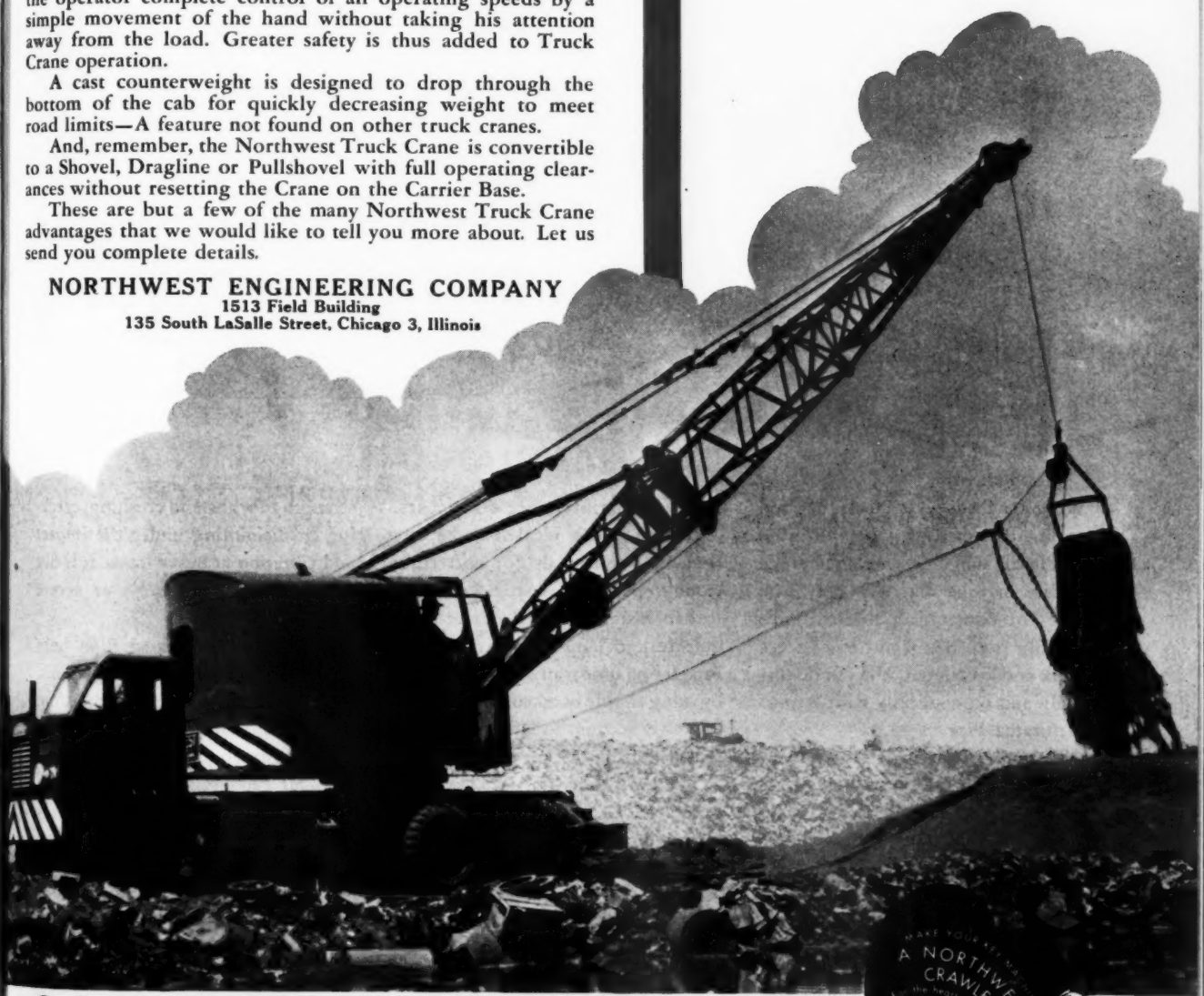
The Boom Hoist is the Northwest High-Speed Power Controlled Boom Hoist and operates independently of *all* other operations. As a Crane it handles booms from 30 to 100 ft. Throttle control mounted on the swing lever gives the operator complete control of all operating speeds by a simple movement of the hand without taking his attention away from the load. Greater safety is thus added to Truck Crane operation.

A cast counterweight is designed to drop through the bottom of the cab for quickly decreasing weight to meet road limits—A feature not found on other truck cranes.

And, remember, the Northwest Truck Crane is convertible to a Shovel, Dragline or Pullshovel with full operating clearances without resetting the Crane on the Carrier Base.

These are but a few of the many Northwest Truck Crane advantages that we would like to tell you more about. Let us send you complete details.

NORTHWEST ENGINEERING COMPANY
1513 Field Building
135 South LaSalle Street, Chicago 3, Illinois



NORTHWEST

THE ALL PURPOSE RAILROAD MACHINE
SHOVEL • CRANE • DRAGLINE • PULLSHOVEL

When roadbeds go to pieces time and again, it's usually a sign of buried rain in the subgrade, even though the surface may be dry. The only sure cure for continuing maintenance trouble is to drain out the excess water and keep it out. You can do this easily and economically with Armco Perforated Pipe.

Through scientifically placed holes, Armco Pipe absorbs unwanted water and drains it away. Subgrades become dry to provide a firm foundation. Frequent maintenance disappears.

Armco Pipe is ideal for complete drainage systems or for correcting trouble spots. It is easy and economical to install. Unskilled workmen quickly join long lengths of Armco Pipe into a uniformly strong conduit by using simple band couplers. There are fewer sections to lay, fewer joints to assemble.

You are assured long, efficient service from Armco Pipe. Though light in weight for easy handling, it has strength to withstand crushing, cracking or disjointing under the impact and vibration of heavy loads. It is not affected by shifting soils or severe frost action.

Let Armco Perforated Pipe help you correct unstable track conditions. You'll like the economy and freedom from maintenance. Write for complete information. Armco Drainage & Metal Products, Inc., 3540 Curtis Street, Middletown, Ohio. Subsidiary of Armco Steel Corporation.

Export: The Armco International Corporation

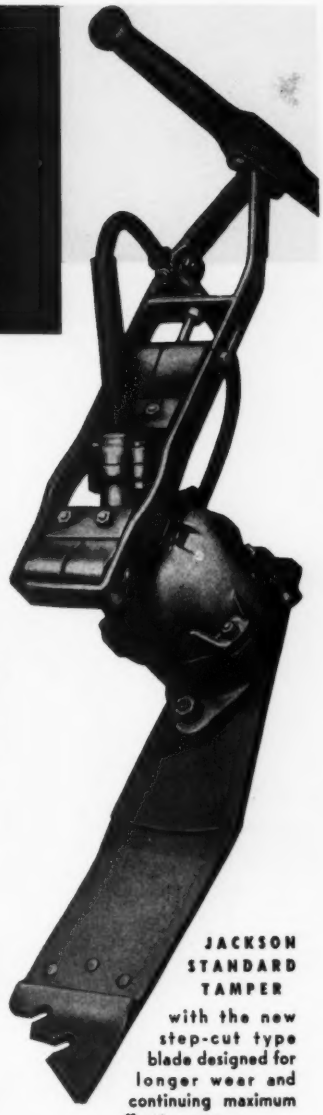
ARMCO PERFORATED PIPE

ARMCO

NEW JACKSON *Tampers* FOR OLD

TAKE ADVANTAGE OF OUR EXCEEDINGLY GENEROUS TRADE-IN ALLOWANCE!

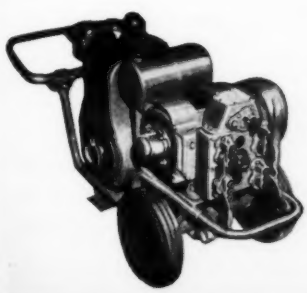
Tough, rugged, reliable and long-lived as they are, Jackson Tie Tampers will finally wear out after many years of service. The Jackson Power Plants operating them, however, are practically indestructible, and for the sole purpose, therefore, of enabling our customers to re-equip such old outfits, we have long had a standing offer to accept, at a most generous credit allowance, the complete motor unit of any worn-out or obsolete Jackson Tamper towards the purchase of the latest model Jackson Tie Tamper complete with handle, blade and lead cable. Regardless of vintage, condition or age, whether they are 15 years or 25 years old, the same credit allowance applies. This is the only offer of its kind made by any manufacturer of tie tampers, and since the trade-in allowance goes a long way toward the purchase of the new equipment, it is well worth investigation on the part of present Jackson users as well as those who contemplate the purchase of manually guided mechanical tampers. Drop us a line for complete details



JACKSON STANDARD TAMPER with the new step-cut type blade designed for longer wear and continuing maximum effectiveness.

HIGHLY EFFICIENT 2-TAMPER OUTFITS ARE OBTAINABLE FROM YOUR PRESENT LARGER JACKSON OUTFITS!

Jackson Tie Tampers are the most versatile tampers made, just as efficient for spot-tamping and such out-of-face surfacing as is usually done by the average section gang, as they are for major ballasting operations. Hence if you have our larger outfits but are unable to operate them because of reduced gangs, may we suggest that by purchasing our Model M-1 Power Plants and using your present tampers you can equip your section gangs of 2 or 3 men and a foreman, with 2-tamper, easily portable outfits which will multiply the gang's effectiveness many times? It's the ideal way to overcome the section maintenance phase of the 40-hour week problem.

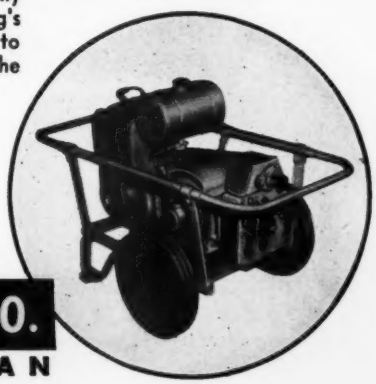


MODEL M-2 POWER PLANT

Model M-2 Power Plant operates 4 tampers. Ideal for the larger section gangs. These outfits may also be grouped to great advantage for major ballasting operations.

MODEL M-1 POWER PLANT

Model M-1 Power Plant operates 2 or 3 tampers; is small enough to be easily tossed onto a motor car by two men.



ELECTRIC TAMPER & EQUIPMENT CO.

LUDINGTON MICHIGAN

THAT SAVES MONEY 5 WAYS

- Easy to apply
- Easy to remove
- Efficient on re-application
- Cannot be overdriven
- Especially adapted to worn and corroded rail bases

Made and sold only by

TRUE TEMPER Corporation

Railway Appliance Division

GENERAL OFFICES CLEVELAND, OHIO

Factory: North Girard, Pa.

District Offices:

2033 Daily News Bldg., Chicago, Ill. • 105 Duane St., New York, N.Y.

Representatives at: St. Louis, Missouri; St. Paul, Minnesota

TRUE TEMPER

ALSO MAKERS OF TRUE TEMPER RAIL FORKS • RAIL JOINT SHIMS • BALLAST FORKS • TRACK SHOVELS • SCOOPS • SCUFFLE HOES • AXES • HAMMERS • HATCHETS • SCYTHES • WEED CUTTERS

NOW

A CLEAN, EFFECTIVE WOOD PRESERVATIVE FOR CAR LUMBER!

penta-chlorophenol

THE CLEAN WOOD PRESERVATIVE

Now that PENTAchlorophenol is available you should protect car lumber as well as ties.

PENTA, already popular with the utilities for the clean, effective protection it gives poles and crossarms, offers a real service to the railroads. Car lumber, decking, wood platforms, poles, all need the dependable protection PENTA gives. PENTA does not leach out even under severest moisture conditions. It protects against termites and decay *through the years.*

When cleanliness and reliability really count, specify "PENTA". For further information write Dow, Dept. PE 4-A

PENTA protects ties!

Protect newly adzed tie surfaces with PENTA. Economical and easy to use, even in coldest weather.

DOW

penta-chlorophenol

THE DOW CHEMICAL COMPANY

MIDLAND, MICHIGAN

It TAMPS!
...as it SAVES!
...as it PAYS FOR ITSELF

No question about it! Actual experiences of railroads that have used Pullman-Standard Power Track Ballasters for several years have *proved* these facts for *you:* (1) This Ballaster not only tamps, it does a *far better job* of tamping. It proves . . . *again* . . . the superiority of machine-production methods over less-efficient hand labor! (2) This machine actually saves enough in direct labor costs to *pay for itself* in one season's average operation.

The Power Ballaster is a boon to the maintenance man who is struggling to control costs under the 40-hour week. Companion equipment . . . the Power Cribber and the Ballast Cleaner . . . provides similar savings.

It's easy to acquire this money-saving equipment, with your choice of three methods: (1) Outright purchase, of course; (2) Easily handled installment terms; (3) A pay-as-you-save rental plan, with option to buy.

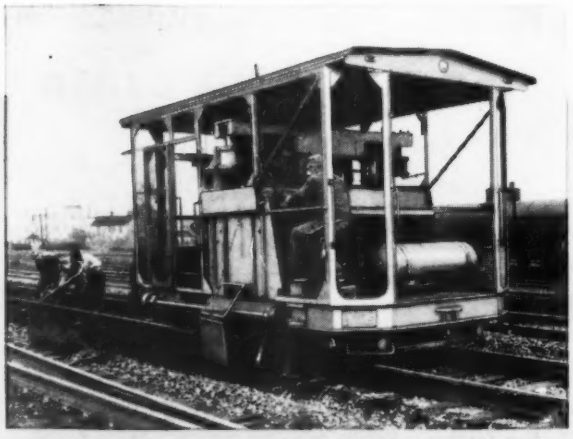
One way or another, you can set up cost records to show the savings, as you invest in a modern track-conditioning system for your railroad. Get the full story today.

Pullman-Standard
CAR MANUFACTURING COMPANY

POWER BALLASTER DIVISION

79 East Adams Street, Chicago 3, Illinois

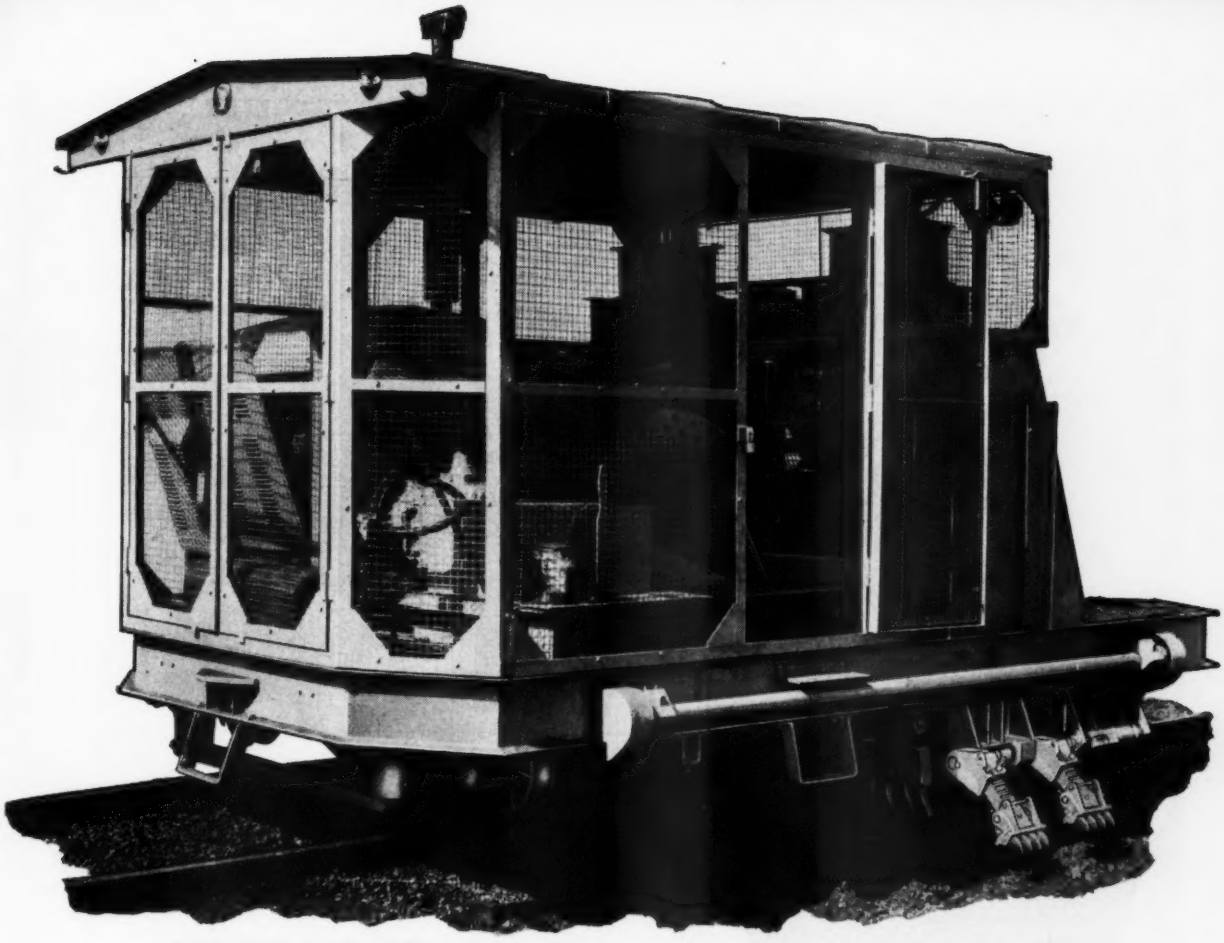
BIRMINGHAM 3, 1004 First National Building • CLEVELAND 15, 907 Midland Building • PITTSBURGH 19, 1115 Gulf Building
NEW YORK 17, 52 Vanderbilt Avenue • WASHINGTON 6, D. C., 1025 Connecticut Avenue, N. W.
SAN FRANCISCO SALES REPRESENTATIVE: MARK NOBLE



COMPANION TRACK-MAINTENANCE EQUIPMENT

POWER TRACK CRIBBER . . . Often called a "mechanized pick-and-shovel gang," the Cribber has impact bars to loosen the ballast, followed by digger bars which clear out the crib. Depending upon traffic and ballast conditions, there have been known savings of $900 to $1,500 per mile over hand cribbing.

BALLAST CLEANER . . . Latest addition to the Pullman-Standard track-conditioning team, the Ballast Cleaner in actual service on the road has clearly indicated savings as high as those recorded with the Cribber and the Power Ballaster. It cleans the crib and both shoulders at the same time, without fouling adjacent track.



PULLMAN-STANDARD POWER BALLASTER

Underneath this machine are eight tamping bars which lift and drop 30 times a minute, on the pile-driver principle. Toward the end of each stroke, a cam-and-roller action forces the ballast under the tie, about two inches below the bottom of the tie. The action is mechanical . . . the result is uniform!

Case History Notes

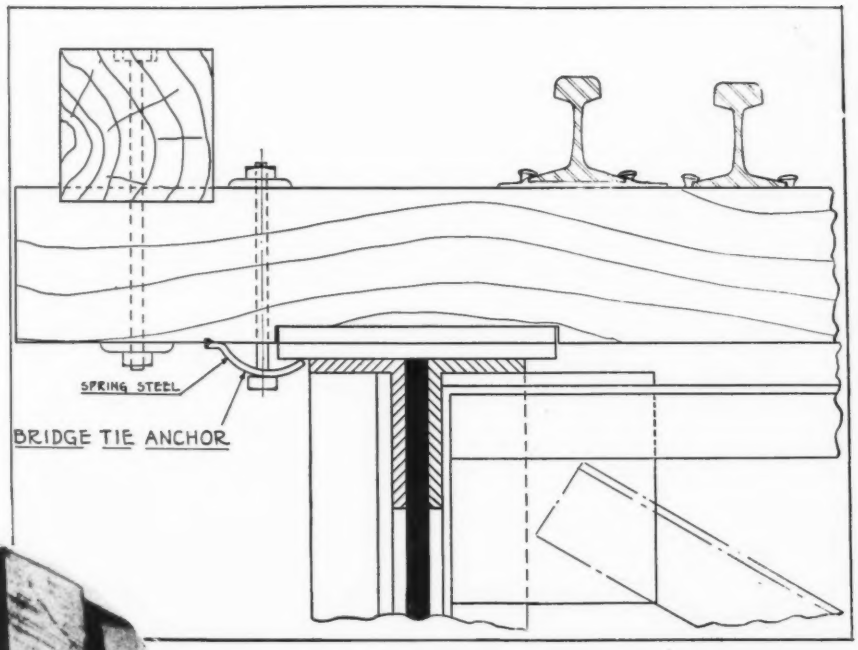
• One railroad experienced an unprecedented low cost of $422.40 per mile with the Power Ballaster . . . against a previous cost of $1,470.00 per mile with the usual pneumatic hand tools. A saving of $1,047.60 per mile!

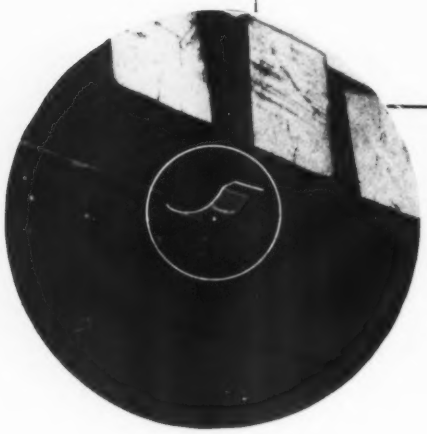
• An eastern road's first test of a Pullman-Standard Power Ballaster showed a saving of $963.78 per mile! More machines were added and, although conditions varied greatly, the savings of a number of machines averaged $600 per mile of track.

• Another road demonstrated a four-machine, production-line operation. Two Cribbers were followed closely by a Cleaner and a Ballaster. With only a 24-man gang to attend them, these machines cribbed out the track, cleaned the ballast, and tamped the ties at the rate of 450 to 600 feet per hour!

• One road, trying its first Power Ballaster, tamped 76 miles of track, averaged 3,200 track feet per day, at a cost of only $380 per mile. Formerly, on this same road, a 28-man gang with 12 pneumatic tamping tools covered only 1,000 track feet per day, at a cost of $1,214.00 per mile. *Saving: $834.00 per mile!*

• **If you don't have your copy of "Track at Its Level Best . . . for Less Money," you are invited to write for one today. This brochure is profusely illustrated with photos and drawings, and it clearly explains the operation of Pullman-Standard's Cribber, Cleaner, and Ballaster.**





BRIDGE TIE ANCHOR

The need for an improved method for fastening or anchoring open deck bridge ties to the supporting steel members has resulted in the development of the Bridge Tie Anchor. This device is a 3-inch wide high-carbon, heat-treated spring steel unit to be used with a standard ¾ inch bridge deck bolt.

The Bridge Tie Anchor is installed on the under side of a bridge tie, as shown in the illustration, and creates a strong spring pressure holding the tie and the supporting member firmly together. All variations in pressure on the bolt caused by the bending of the bridge ties under wheel loads are absorbed in the spring action, the load on the bolt increasing very little as compared with that of the usual rigid connection.

The Bridge Tie Anchor is simple to install, low in first cost and economical to maintain. One size fits all structures.

THE RAILS COMPANY

General Office
178 GOFFE STREET, NEW HAVEN 11, CONN.

ST. LOUIS, MO. HOBOKEN, N. J. CHICAGO, ILL.

Safeguard Rail Travel with PITTSBURGH SNOLITE White Paint

(Fume-Proof)

Whiter Initially—Stays White Longer

. . . for signs, crossing gates, fences, and cattle guards

TODAY'S schedules require that all types of signs be maintained at new standards for safer operation at higher speeds.

Pittsburgh provides a white finish for this purpose that is whiter initially and provides higher visibility. SNOLITE is a fume-proof durable coating for signs, crossing gates, fences, cattle guards, etc.

SNOLITE dries to a smooth surface of superior whiteness which eventually chalks instead of checking or cracking. Industrial gases and smoke fumes will not darken or discolor it.

Write today for Pittsburgh's new booklet of Railway Structural Finishes. It may help to save you time and money.

• • •

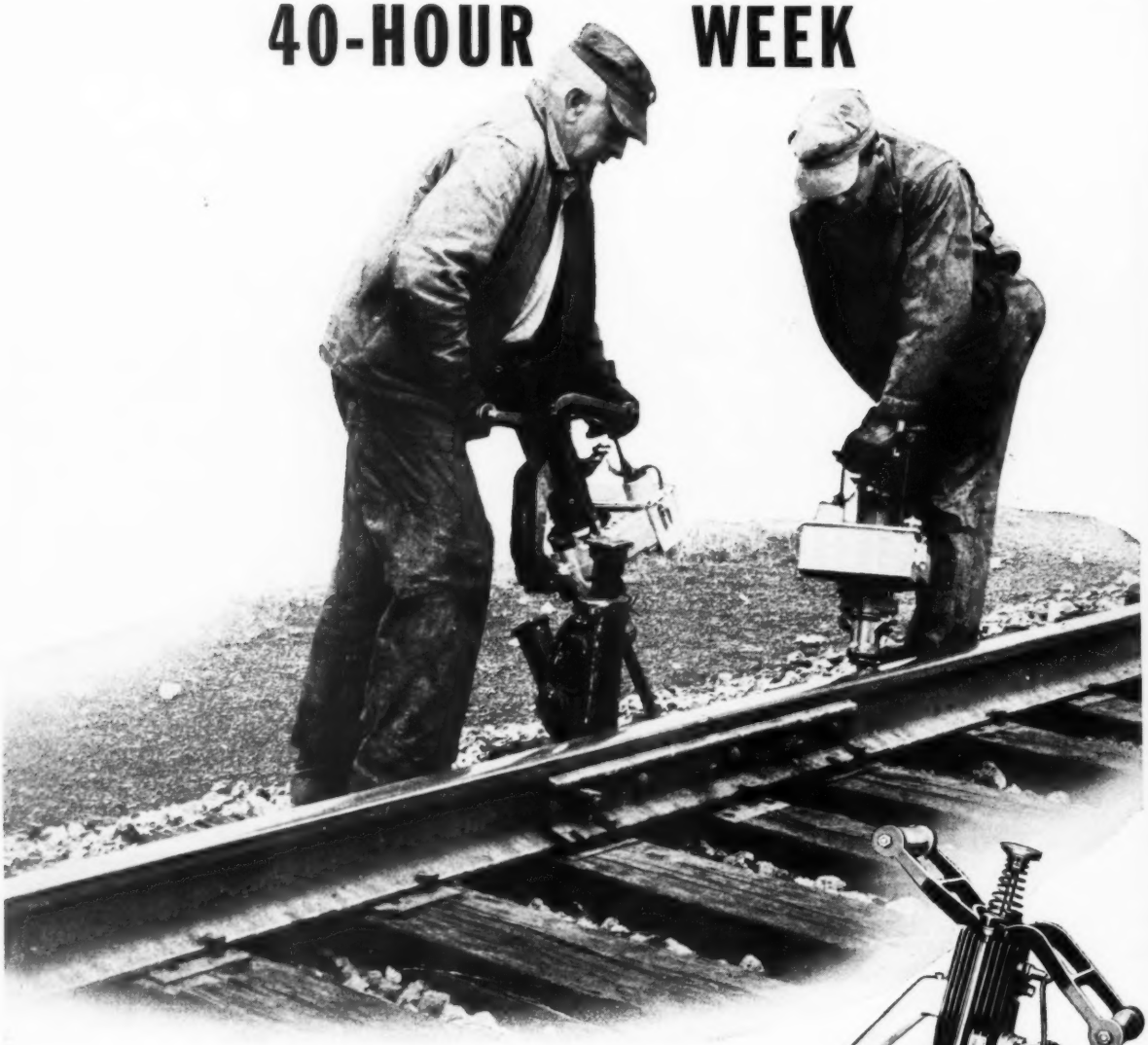
PITTSBURGH PLATE GLASS COMPANY
Industrial Paint Division, Pittsburgh, Pa.
Factories: Milwaukee, Wis.; Newark, N. J.; Springdale, Pa.; Houston, Texas; Los Angeles, Calif.; Portland, Ore. Ditzler Color Division, Detroit, Mich. The Thresher Paint & Varnish Co., Dayton, Ohio. Forbes Finishes Division, Cleveland, Ohio. M. B. Suydam Division, Pittsburgh, Pa.

PITTSBURGH PAINTS

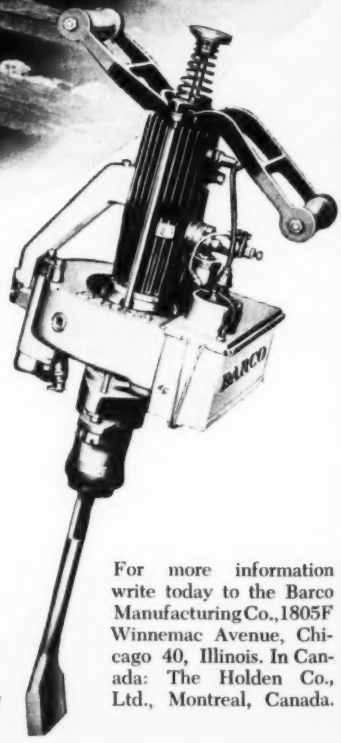
PAINTS • GLASS • CHEMICALS • BRUSHES • PLASTICS

PITTSBURGH PLATE GLASS COMPANY

MORE BARCOS WILL HELP SOLVE THE 40-HOUR WEEK



By maintaining track with less large gang work • BARCO has more power and will tamp more ties better • Will tamp cemented ballast • Will not tie up the tracks • May be used for other work when not tamping • No expensive equipment to be tied up for months each year



BARCO

UNIT TYTAMPERS

FREE ENTERPRISE—THE CORNERSTONE OF AMERICAN PROSPERITY

For more information write today to the Barco Manufacturing Co., 1805F Winnemac Avenue, Chicago 40, Illinois. In Canada: The Holden Co., Ltd., Montreal, Canada.

HOW "CATERPILLAR" KEEPS 'EM PUNCHING

WITH "Caterpillar's" tested parts-merchandising plan, there's no such thing as part-time operation of "Caterpillar" equipment.

Railroad men know that precision engineering cuts the *down* time of "Caterpillar" Railroad Diesels to the bone. And they've found that occasional parts replacement is a matter of hours, not weeks. Here's why:

"CATERPILLAR" DEALERS

Over 300 dealer parts stores and service shops in the U. S. and Canada — more than 275 in 125 foreign countries. Thousands of items are stocked for *immediate* parts service, depending upon machine population in each dealer's territory.

"CATERPILLAR" PARTS DEPOTS

Eight of them, strategically spread-eagling the nation, each stock more than 25,000 items, ranging from heavy, slow-moving parts to light items. Long experience determines quantity of each kept on hand so there will be no short supply.

FACTORY PARTS STORAGE

No "orphans" in the "Caterpillar" line. The factory stocks over 65,000 different items; it also stores non-current jigs and fixtures to make non-current parts at reasonable customer prices. Parts were recently shipped for a 30-year-old blade grader—for a 1918 two-ton tractor!

Why not drop in on the "Caterpillar" dealer in your territory and see what he can do to help you?

CATERPILLAR TRACTOR CO. • PEORIA, ILL.

Well-stocked parts shelves in a typical "Caterpillar" dealer store.

Parts processing and packaging are scientifically handled. More than 8000 items are individually packaged, clearly marked for ready identification—easy to handle, easy to store. Chemically treated wax and Vapor-Wrapper paper give complete protection — prevent corrosion and cover greased or oiled parts. Cartons are extra strong and cartons for overseas shipment are lined with Vapor-Wrapper. Parts are shipped in wooden boxes lined with waterproof paper. Quality parts protected by quality processing and packaging.

CATERPILLAR
REG. U. S. PAT. OFF.
RAILROAD DIESELS

Every Homelite Product Is Always Better

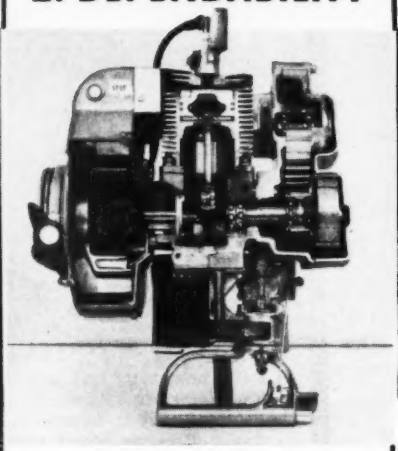
THREE WAYS

THE HOMELITE GASOLINE-ENGINE-DRIVEN ONE MAN CHAIN SAW

1. PERFORMANCE

Typical of all Homelite products, the Homelite Gasoline-Engine-Driven Chain Saw handles like a feather yet cuts faster and with less trouble . . . whether it's felling, bucking, notching or undercutting . . . than any other saw its size.

2. DEPENDABILITY



Typical, again, of all Homelite products, the Homelite One Man Chain Saw is powerfully driven by the time-proven famous Homelite gasoline engine . . . a simple, foolproof engine that is the exclusive result of Homelite's experience in building close to 300,000 gasoline-engine-driven units.

3. SERVICE

In addition to all the low maintenance features of Homelite Chain Saws . . . the permasharp, chrome-plated chain, the liningless automatic clutch, the freedom from gears and oil seals, and the automatic lubrication . . . Homelite service shops the country over bring trained mechanics almost to your door, to keep your Homelite Chain Saw right up to Homelite nation-known performance standards.

PERFORMANCE DEPENDABILITY SERVICE

Homelite Corporation

205 RIVERDALE AVENUE, PORT CHESTER, NEW YORK

MANUFACTURERS OF HOMELITE CARRYABLE PUMPS • GENERATORS • BLOWERS • CHAIN SAWS • PAVING BREAKERS

STICK TO THE RULE OF THREE

1. **Performance**
2. **Dependability**
3. **Service . . . and you'll always stick to a Homelite**

For additional information, use postcard, pages 439-440

B. & O. Bridge, Loogootee, Indiana, before and after being repaired by the Non-Shrink Embeco Repair Method. One of many Embeco repair jobs done by George E. Detzel Co., Cincinnati, Ohio, Restoration Contractors.

Non-Shrink EMBECO Repairs Assure Many Additional Years Service

Cost-minded railroads that want to keep down maintenance expense are bringing their properties up to the requirements for safe, adequate and modernized transportation by the Non-Shrink Embeco Repair Method.

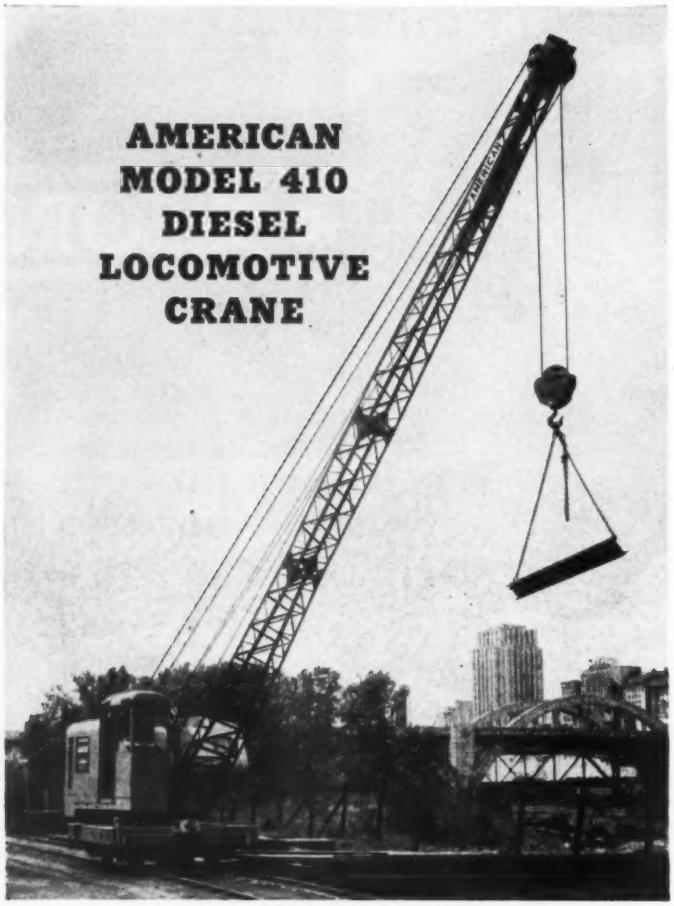
By eliminating all shrinkage in mortar and grout, Embeco insures a strong bond and long-life repairs. Non-Shrink Embeco has been successfully used for fifteen years for grouting bridge, turntable and heavy machinery bed plates, repointing old stone structures, reintegration of concrete masonry piers and abutments and the application of gunned concrete for tunnel lining, repairing and retaining walls, dams, abutments and piers.

Write for full information.

MASTER BUILDERS

MASTER BUILT PRODUCTS

CLEVELAND 3, OHIO — **TORONTO, ONTARIO**



Works one hour on one gallon of fuel!

"Busiest piece of equipment we own..."

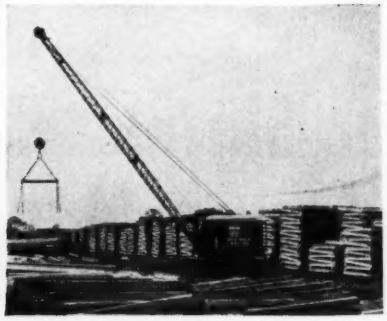
"Busiest piece of equipment we own" . . . "Never knew we had so many jobs for it to do" . . . "Gets around like a jack-rabbit" . . . "Ours is booked up for weeks ahead" . . .

That's the kind of talk you hear about the brilliant new American Model 410. Rated at 10 tons capacity, it's amazingly versatile and capable. Works on light track or bumpy track —anywhere. Shows its speed, its smoothness, its flexibility equally well with bucket, hook or magnet.

Want a crane that will almost never stand idle? One that works for a dollar-a-day fuel ration? One that cuts maintenance costs to the vanishing point? Mail the coupon below for literature!

BUCKET WORK shows off the Model 410's superb operating smoothness . . . fast swinging . . . quick action boom hoist. It moves coal, cinders, gravel, other materials . . . *fast.*

MAGNET WORK is making the 410 famous as one of the greatest scrap-handlers of all time. American push-button control provides over-excitation of magnet.



HOOK WORK highlights the perfect precision of American air controlled clutches. In addition, the 410 is adaptable to almost any type of special tackle.

American Hoist
& DERRICK COMPANY
St. Paul 1, Minnesota

Plant No. 2: SO. KEARNY, N.J.

Sales Offices: NEW YORK • PITTSBURGH • CHICAGO

American Hoist & Derrick Company
St. Paul 1, Minnesota 6 5810

● Please send literature on the American Model 410 Diesel Locomotive Crane.

Name_____

Company_____

Address_____

City_____ Zone____ State_____

The little label with the big message

WHY do more than 1,000 manufacturers put this label on their products? Because it tells a story of *extra* value to every prospective buyer.

When a customer for your product sees the "Timken® Bearing Equipped" label, he knows he can count on dependable bearing performance. He knows that moving parts will last longer, work better, because they're held in proper alignment. He knows that friction is reduced to a minimum, maintenance and lubrication time cut. He's sure of extra years of service both in the bearings and in related assemblies.

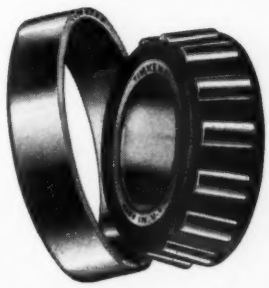
The "Timken Bearing Equipped" label has come to mean all these things for two main reasons: the outstanding *performance* of Timken tapered roller bearings for more than 50 years; the widespread *acceptance* of Timken products throughout all industry.

If you make a product in which wheels and shafts turn, give it an extra sales feature by using Timken tapered roller bearings. And make the most of that sales feature by using the "Timken Bearing Equipped" label in advertisements, booklets, folders, and on the equipment itself. For help in making use of the "Timken Bearing Equipped" label write The Timken Roller Bearing Company, Canton 6, Ohio. Cable address: "TIMROSCO".

TIMKEN

TRADE MARK REG. U.S. PAT. OFF.

TAPERED ROLLER BEARINGS



NOT JUST A BALL — NOT JUST A ROLLER — THE TIMKEN TAPERED ROLLER — BEARING TAKES RADIAL AND THRUST — LOADS OR ANY COMBINATION

HUBBARD & CO.
TOOL DIV.
PITTSBURGH, PA.

THE TRADE MARK
THAT
ASSURES THE BEST
IN
TRACK TOOLS
AND
SPRING WASHERS

HUBBARD AND COMPANY
TOOL DIVISION
NEW YORK • PITTSBURGH • CHICAGO

ALSO PRODUCES
THE 'MORE RUGGED IN EVERY RESPECT'
UNIT RAIL ANCHOR

MULTI-PURPOSE

NEW TYPE COATING

1. Prolongs rail life

2. Cuts railway maintenance costs

Rust-Chek

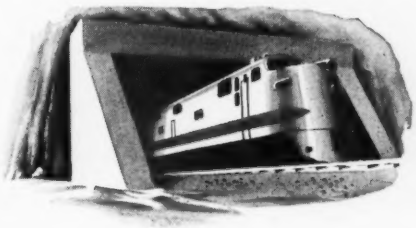
CORROSION-RESISTANT COATING

...resists water, salt and acid fumes

RUST-CHEK was originally developed by the Rinshed-Mason Company to prevent the notoriously excessive corrosion of railway track in tunnels. Applied to the web and base of rails, Rust-Chek prolongs rail life where the going is rough; is unaffected by the impact of train wheels and the consequent flexing of the rails.

Today, Rust-Chek is finding ever widening acceptance for numerous other railway applications, but especially where corrosion conditions are severe, for Rust-Chek possesses exceptional resistance to water, salt and acid fumes; retains, with long years of service, unusual qualities of flexibility and adhesion that definitely prevent cracking, chipping or peeling.

Investigate now! Skilled R-M engineers to assist you.

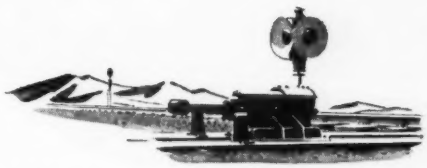


PREVENTS EXCESSIVE RAIL CORROSION

Salt, water and acid fumes often cause frequent and costly rail replacement. Rust-Chek prevents excessive corrosion, but especially in certain tunnels; on rails subjected to brine drippings from heavy refrigerator car traffic; on rails running close to salt water, at grade crossings, etc.

PROTECTS BRIDGES AND STRUCTURAL STEEL

Bridges, round-house structural steel, etc., can be quickly and easily coated with Rust-Chek, adding countless years of life and greatly lengthening time between coats. Rust-Chek puts up a solid front against salt spray, locomotive fumes and moisture.



PROLONGS LIFE OF COSTLY EQUIPMENT

Signalling equipment, water towers, steel boats, barges, buoys, docks, and numerous other types of railway-owned equipment, need Rust-Chek protection for greatly prolonged service life. Unusually tough and highly water resistant, Rust-Chek is easy to apply, calls for no special equipment and may be either brushed or sprayed.

Write for DESCRIPTIVE FOLDER

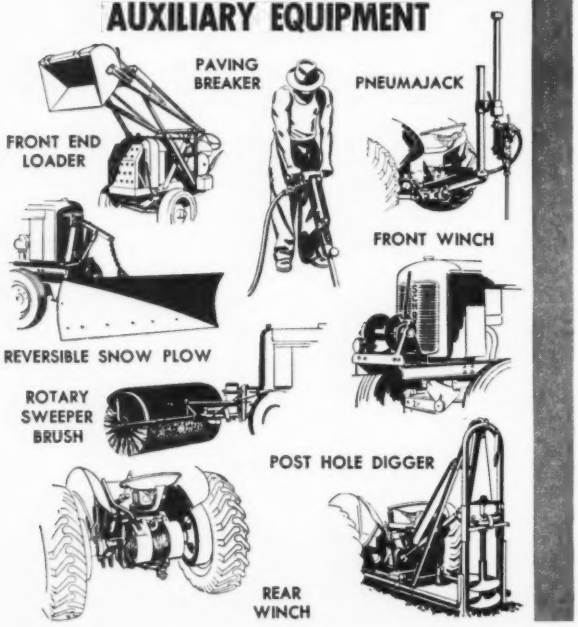
Free Descriptive Folder and specifications will be sent you on request. Test sample will also be forwarded if wanted. *Write now.*

RINSHED-MASON CO.

5935-71 MILFORD AVE. . . . DETROIT 10, MICH.

The Pneumatractor

SCHRAMM *PNEUMATRACTOR* AUXILIARY EQUIPMENT



. . . Presenting the Latest—Most Modern

SELF-PROPELLED AIR COMPRESSOR

SCHRAMM'S newest unit: the *Pneumatractor*; an air compressor that is also a tractor.

Extremely versatile, it is NOT a power takeoff or power unit mounted on a tractor, but is powered with Standard Model 60' *Unistage* or the 105' *Pneumapower* Schramm Compressor. Available with a completely engineered and approved set of accessories, a few of which are illustrated at the left.

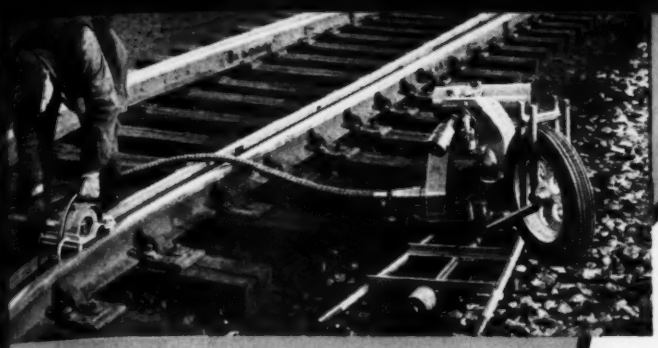
FOR FULL DETAILS, WRITE TODAY FOR BULLETIN NEU-50.

SCHRAMM INC.

The Compressor People

WEST CHESTER • PENNSYLVANIA

For additional information, use postcard, pages 439-440



Above: UTILITY GRINDER, Model UG, removing flow at switchpoints and stockrails. With other Nordberg accessories, it can be used for surface grinding, rail end slotting, frog grinding, etc. Particularly suited to work in congested traffic areas.

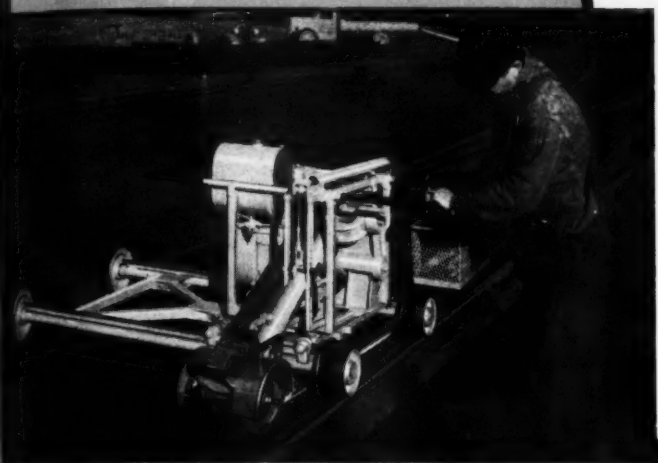
NORDBERG GRINDERS

for every rail, switch or frog grinding job

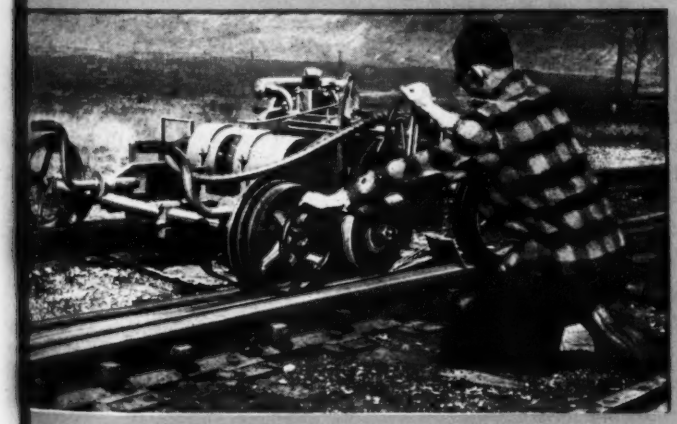
From these Nordberg Grinders, select the grinder best adapted to your track maintenance grinding requirements. You can be assured of faster and better maintenance grinding with Nordberg on the job.

NORDBERG MFG. CO.
MILWAUKEE 7, WISCONSIN

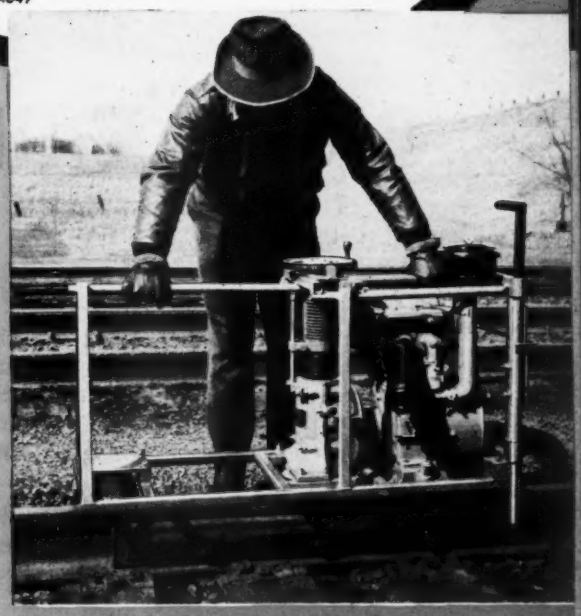
R649



Above: FLEXIBLE ARM GRINDER, Model FG, grinding switchpoint. With various types of grinding wheels this grinder is also used for rail end slotting, undercutting stockrails, grinding frogs, etc. A fast cutting grinder with big production capacity.



Above: HEAVY-DUTY RAIL GRINDER, Model HDG, grinding a frog. Recommended where speed, output, and accurate surface grinding are desired. With accessories, it can be used for slotting rail ends, grinding switchpoints, and flangeway grinding at frogs and crossings.



Above: MIDGET GRINDER, Model EG, a one-man cup wheel grinder for surface grinding welded joints, removing mill tolerance, equalizing cropped rails, and grinding out corrugations or wheel burns. It is especially applicable for use in congested traffic areas.

NORDBERG TRACK MAINTENANCE MACHINERY

Saves time — Does better work — Reduces expense

Speno BALLAST CLEANER

Clean Ballast *at Lowest Cost*

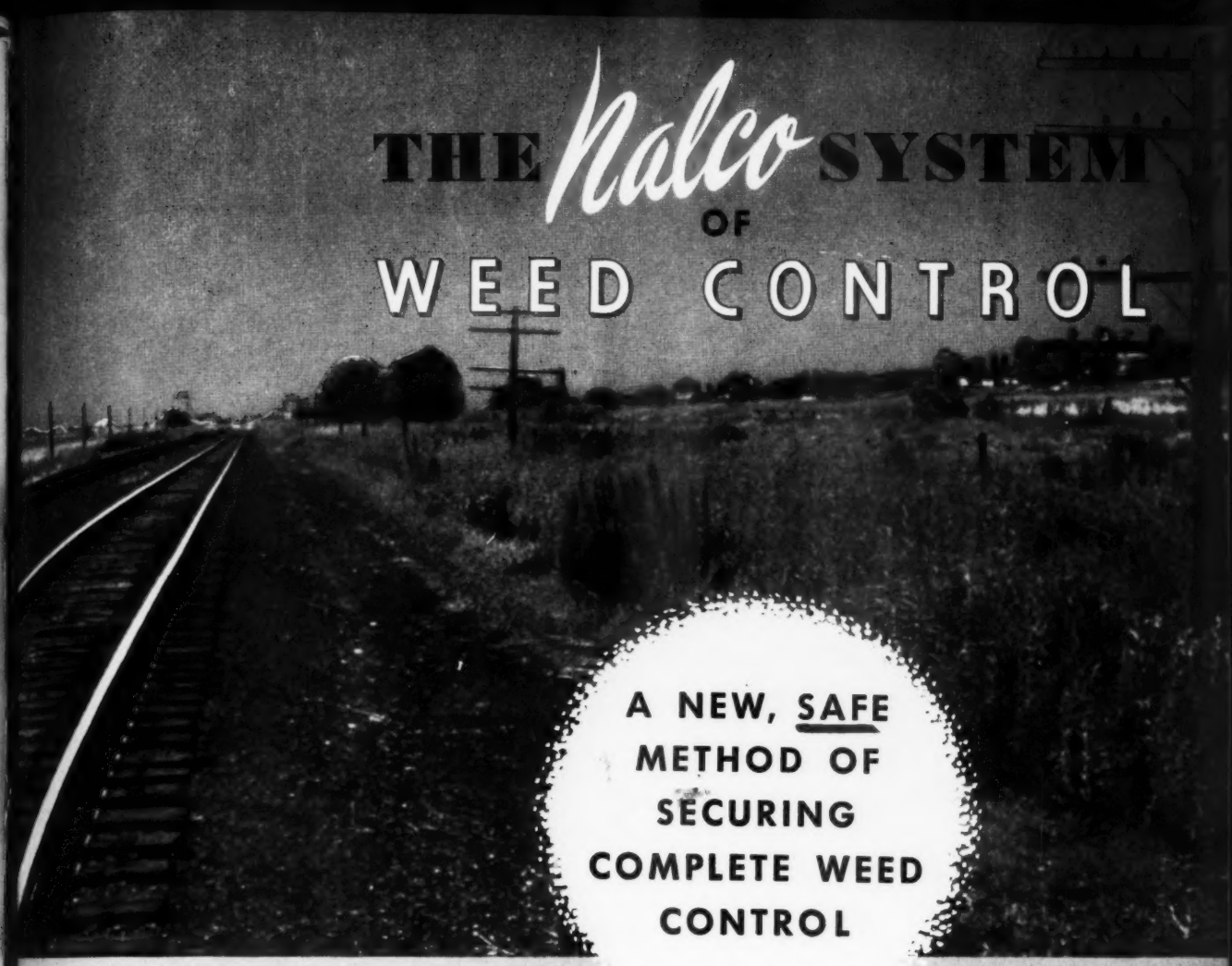
The Speno method results in a self-cribbing track—cleaning that lasts from one general track raise to the next. Long experience in the field, not theory,—equipment that has been steadily improved—means a thorough, lasting job and important maintenance economies in both track and rolling stock.

With the Speno method, stone ballast is twice screened. The two passes are completed in less time than a single pass under other methods. Speno equipment works under traffic and is the only large ballast cleaning machine that *does not foul trains on adjacent tracks* while in operation. The speed and capacity of Speno performance can best be gauged by the 1949 record of one of our units. 725 single track miles were cleaned in 1435 hours of actual working time. With the two cuts made, this is equivalent to 1450 miles of ballast cleaning by other ballast cleaning methods.

We shall gladly work out a program with you.

FRANK SPENO RAILROAD BALLAST CLEANING CO. INC.

628 West State Street Ithaca, N. Y.



THE *Nalco* SYSTEM OF WEED CONTROL

A NEW, SAFE METHOD OF SECURING COMPLETE WEED CONTROL

Nalco H-170 combines "contact" or top-killing action with translocation or root-killing action.

Extremely rapid penetration and translocation in the plant.

Extensive root kill retards regrowth.

Low volatility eliminates fire hazard.

Non-conductor—will not disrupt track signal circuits.

Safe to use where livestock may be grazing.

Completely insoluble in water—will not contaminate water supplies. Rainfall after application does not reduce effectiveness.

No mixing required.

NALCO H-170 Weed Killer is a product of nearly five years of laboratory research, tests and field trials on railroad right-of-way. Its combined properties assure a complete top kill of all succulent vegetation, plus extensive root kill on many of the hardiest weed species. H-170 can be applied with any type of sprayer, and is used directly from the drums without mixing or dilution.

Maintenance men are enthusiastic about H-170, not only because of the thorough weed killing, but also because it does not imperil livestock and creates no fire hazard—either in storage or when being applied.

Average right-of-way dosage of Nalco H-170 is one gallon per 1,500 square feet. Where weed growth is high, slightly greater dosage is recommended. H-170 has effectively killed growths up to 30 inches high.

Full information on H-170 is available from your Nalco Representative, or direct from Nalco.

NATIONAL ALUMINATE CORPORATION

6196 West 66th Place • Chicago 38, Illinois

Canadian inquiries should be addressed to Alchem Limited
Burlington, Ontario, Canada

THE *Nalco* SYSTEM • Serving Railroads through Practical Applied Science

How to HANDLE A

The Most Advanced Tractor in its Power Class . . . .

BIG WORK CAPACITY — This completely new, smaller tractor has big tractor design, balance and stamina . . . surprises users everywhere with its performance. As owners say, "You've got to see it to believe it."

JUST THE RIGHT SIZE — To efficiently handle a wide variety of jobs. Has 11,250 lb. of properly balanced weight (tractor bare) . . . 49.26 drawbar hp. provided by the smooth-running, economical, 2-cycle GM diesel engine — every down stroke a power stroke!

NEEDS LESS GREASING THAN AN AUTOMOBILE — Instead of hitting a dozen or more grease fittings every shift, you lubricate only one fitting every two weeks, two other fittings every five weeks (based on 40-hour weeks). *And you operate a full 1,000 hours* before replenishing lubricant in truck wheels, track idlers and support rollers.

SIMPLE TO SERVICE — All adjustments are unusually accessible. Major assemblies are removable without disturbing unrelated parts — engine, clutches, transmission, etc. There's less down time — more time working . . . labor and repair costs are reduced.

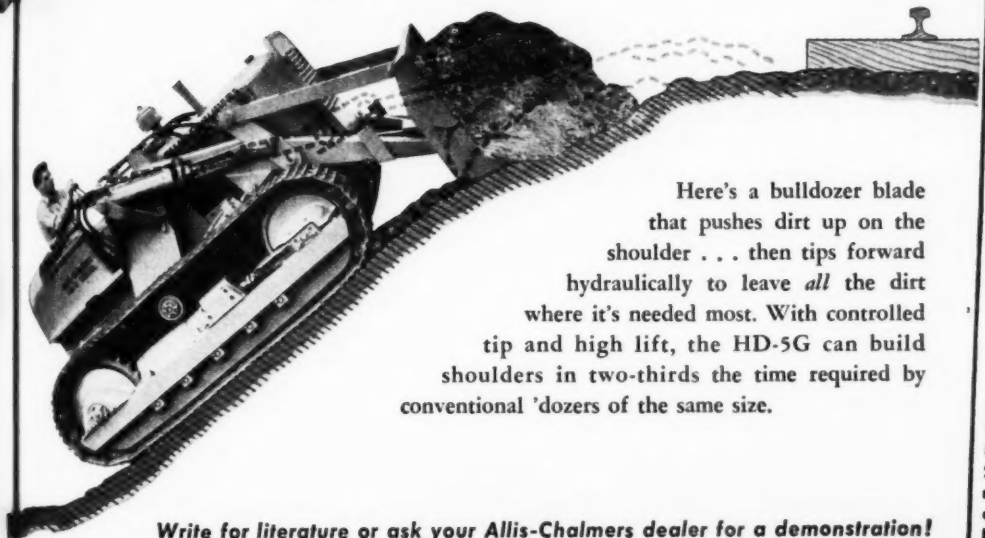
BUILT-IN SAFETY AND CONVENIENCE — Easier steering and shifting with convenient controls, full vision. Cushioned seat, wide arm rests. Operator gets more done because it's easier to do more!

A VARIETY OF JOBS

on a single, lower investment

USE THE ALLIS-CHALMERS HD-5G AND TRACTO-SHOVEL INTERCHANGEABLE ATTACHMENTS*

You can build up shoulders — place ballast — handle ties — transport and lay rail — dig, carry, dump and spread any kind of material — build and maintain access roads — remove brush — plow snow or load it — cut costs on dozens of other jobs — all with this standard machine and one or more specially designed attachments. Start now to stretch your budget . . . investigate!



Here's a bulldozer blade that pushes dirt up on the shoulder . . . then tips forward hydraulically to leave *all* the dirt where it's needed most. With controlled tip and high lift, the HD-5G can build shoulders in two-thirds the time required by conventional 'dozers of the same size.

Write for literature or ask your Allis-Chalmers dealer for a demonstration!

*These 14 Tracto-Shovel Attachments

Can be Interchanged in but a Few Minutes

The usefulness of the HD-5 Tractor is further widened by other allied equipment: 2-wheel scrapers, rippers, rollers, cranes, skid loaders, canopies, winches and log carts.

ALLIS-CHALMERS

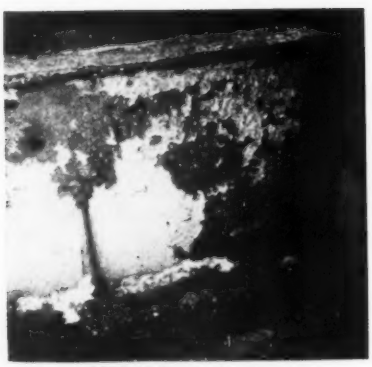
TRACTOR DIVISION · MILWAUKEE 1 U. S. A.

for Greater Production
for Easier Operation
for Simplified Servicing

how flame cleaning

prolongs life of exposed steel surfaces

Flame cleaning upper deck beam flange



BEFORE flame cleaning

AFTER flame cleaning and wire brushing

Quickly, easily and safely applied, the Airco flame cleaning process provides a clean, warm and dry surface conducive to a lasting paint job. The oxyacetylene flame cockles old paint, loosens rust and drives off hidden moisture . . . gives longer paint life to all kinds of steel structures.

Some of the numerous applications of flame cleaning in railroad maintenance of way operations involve bridges, water towers and signalling equipment. A good single example is used by a leading Southern road — flame cleaning railroad track scales, where the scales are installed in pits and covered with wooden or steel platforms. In applications of this kind, the steel is damp for long periods after a rain, and is subject to sweating at times. This condition leads to rapid corrosion and deterioration of the steel.

The road flame cleans the steel members, and paints them while still warm. The flame cleaning loosens the scale and accumulated rust, and wire brushing eliminates it completely. All dirt and trapped moisture is removed — leaving nothing, on the steel surface to be painted, to start corrosion . . . reducing future maintenance costs to absolute minimum.

For further details on Flame Cleaning, write your nearest Airco office for free copies of the folder ADG-1066B.

Costs Come Down Under the Airco Plan

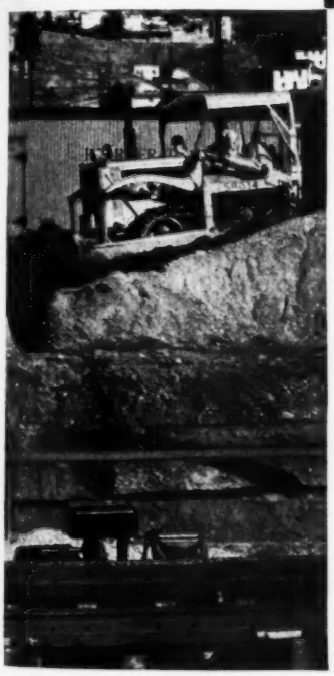
AIRCO

AIR REDUCTION

Offices in Principal Cities

Headquarters for Oxygen, Acetylene and Other Gases... Calcium Carbide... Gas Cutting Machines... Gas Welding Apparatus and Supplies... Arc Welders, Electrodes and Accessories

"BEST FOR THE TIGHT SPOTS"



"From an operator's standpoint, the International TD-14A is best for work in tight spots. It's easy to operate and because of its power, I can run it at half throttle and still keep up with or ahead of tractors of the same size or larger."

So says operator E. Blalock of Los Angeles, Calif., who is handling the tractor on a dirt moving job in a busy railroad yard.

Here's one more testimonial to the power and ease of handling of the TD-14A. It's ideal for heavy work in close quarters.

Your International Industrial Power Distributor is ready to help you select the right size International Crawler or wheel tractor for your railroad maintenance and construction jobs. Internationals fit neatly into yard and shop work as well as maintenance of way projects. See your distributor now about the power and matched equipment you need for workin' on the railroad.

INTERNATIONAL HARVESTER COMPANY • Chicago

Tune in James Melton and "Harvest of Stars," NBC, Sunday afternoons

Standardize on Power that Pays

CRAWLER TRACTORS
WHEEL TRACTORS
DIESEL ENGINES
POWER UNITS

INTERNATIONAL HARVESTER

INTERNATIONAL INDUSTRIAL POWER

BEALL Hi-Duty SPRING WASHERS

made especially for Railroad Service

BEALL Hi-Duty SPRING WASHERS are made especially to stand the strain of the heavy-duty rail service required by today's high-speed freight and passenger trains.

We control every step of their manufacture — from the specification of the specially-developed formula and process used in making the steel to the forming, hardening, tempering and testing operations.

Their dependability has been proven by years of actual service on hundreds of railroads.

BEALL HI-DUTY SPRING WASHERS, being made especially for railroad service are strong and tough, yet provide the necessary "springing action" required at rail joints, frogs and crossings.

BEALL TOOL DIVISION (HUBBARD & CO.)
140 Shamrock St., EAST ALTON, ILL.
SPECIALIST MANUFACTURERS OF SPRING WASHERS

Faster Grinding
AT LESS COST
On or Off Track

With P-44
Portable Flexible Shaft Grinder

You'll appreciate the added savings in time and labor cost you get with the P-44 Portable Flexible Shaft Grinder. Unsurpassed for fast, accurate grinding, on and off track, its simplicity, versatility and easy handling will make it a valuable and popular addition to your track equipment. Look at these time and money saving features:

- Grinder's 360° swivel engine mount prevents short bends and kinking of flexible shaft.
- Clutch assembly in engine protects shaft from overload.
- Three position wheel clears switches and crossovers easily. Quickly adjusted for off track use.
- Light and compact, it gets on and off the track fast. Can be used under heavy traffic.
- Quickly adaptable for auxiliary equipment; Straight Wheel Hand Piece, Angle Hand Piece for Cup Wheel, Cross Grinder Guide and Track Drill.

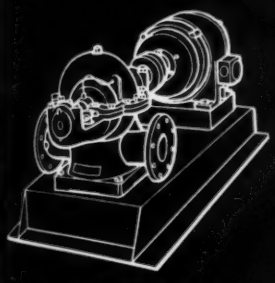
Further information on this and other RTW track maintenance equipment available on request.

Railway Track-work Co.
3207 KENSINGTON AVE., PHILADELHIA 34, PA.

Distributors for

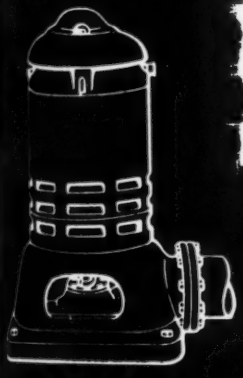
Burro Cranes
Dapco Sprayers
LeRoi Air Compressors
McCulloch Chain Saws
THOR Electric Tools
Wayer Impactors

5455

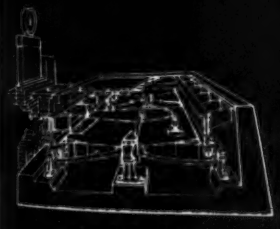


Centrifugal Pumps

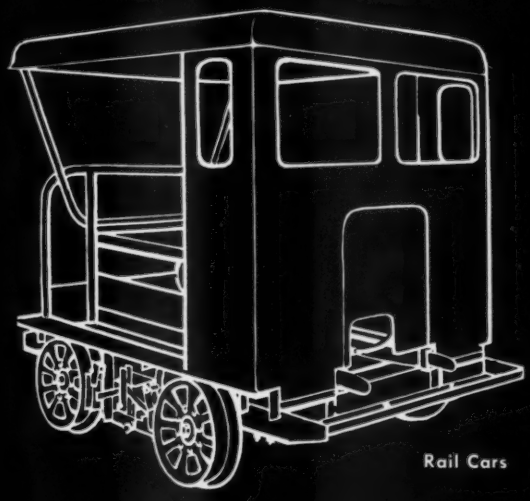
Electric Motors and Generators



Turbine Pumps



Truck Scales



Rail Cars

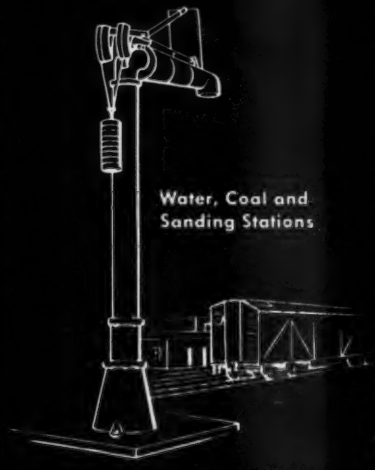
FOR RAILROAD EQUIPMENT

IT'S

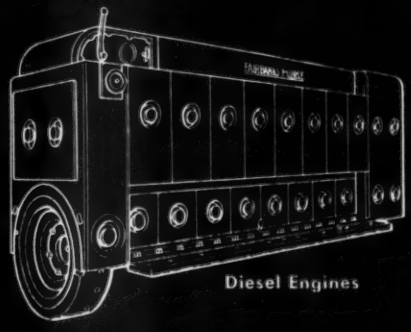
FAIRBANKS-MORSE,

a name worth remembering

DIESEL LOCOMOTIVES AND ENGINES • ELECTRICAL MACHINERY • PUMPS • SCALES
HOME WATER SERVICE AND HEATING EQUIPMENT • RAIL CARS • FARM MACHINERY

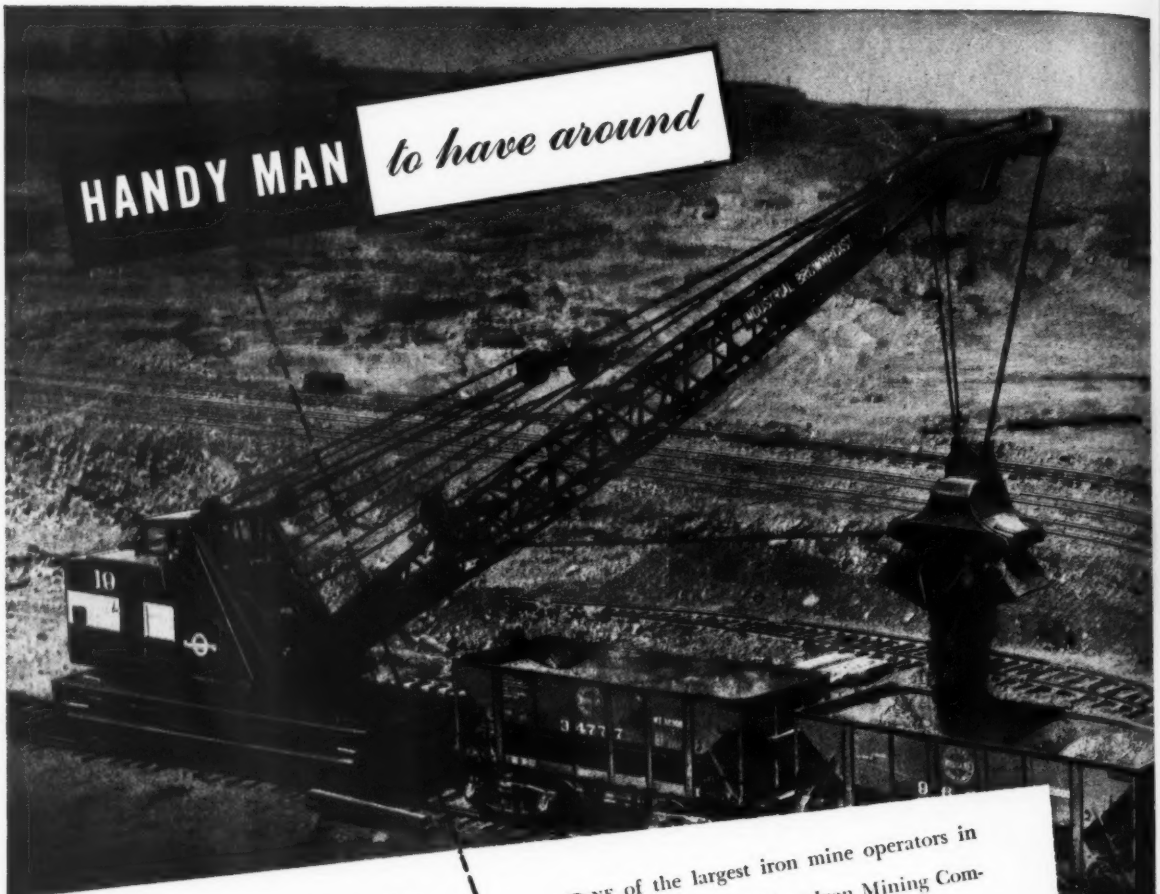


Water, Coal and Sanding Stations



Diesel Engines

Track Scales



HANDY MAN *to have around*

Oliver Iron Mining Co. profitably uses five versatile Brownhoist Diesel Electric Locomotive-Cranes

ONE of the largest iron mine operators in the world, The Oliver Iron Mining Company, gets good steady day-after-day performance in the great Mesabi Range from five 60-ton BROWNHOIST DIESEL ELECTRIC LOCOMOTIVE-CRANES, such as the one pictured here. Track ballasting, relaying mine track, railing cars, and many other tough service jobs are assigned this husky Locomotive-Crane.

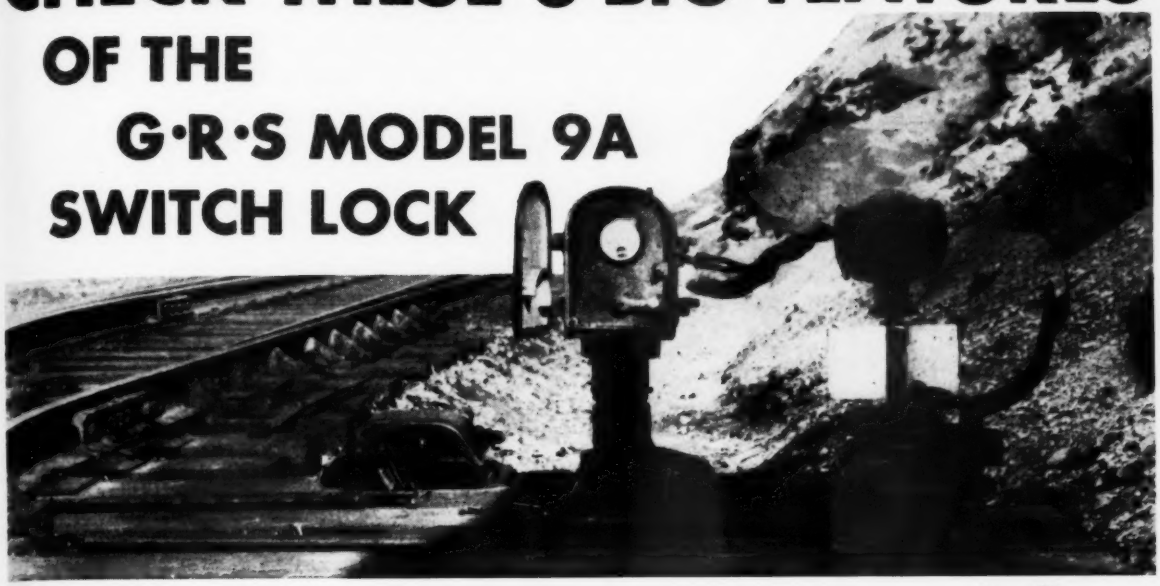
You can put this "handy man" to work in your operation for mighty small "keep." BROWNHOIST offers you a complete DIESEL ELECTRIC LOCOMOTIVE-CRANE line . . . 30 ton for general yard work; 50 ton for heavy duty bucket and magnet work with longer booms; and, the heavier 60 ton for work demanding an especially rugged, versatile machine. Write for complete data, today.

Brownhoist builds better cranes

INDUSTRIAL BROWNHOIST CORPORATION • BAY CITY, MICHIGAN

DISTRICT OFFICES: New York, Philadelphia, Cleveland, San Francisco, Chicago. **AGENCIES:** Detroit, Birmingham, Houston, Los Angeles, Portland, Seattle, Spokane, Canadian Brownhoist Ltd., Montreal, Quebec.

CHECK THESE 3 BIG FEATURES OF THE G·R·S MODEL 9A SWITCH LOCK



1. LOCKS THE LOCK ROD

This feature means *double* protection. Besides enforcing proper use of the switch, the Model 9A locks the switch points solidly in place. This locking is in addition to and independent of the locking provided by the switch stand.

2. REVERSE LOCKING EASILY ADDED

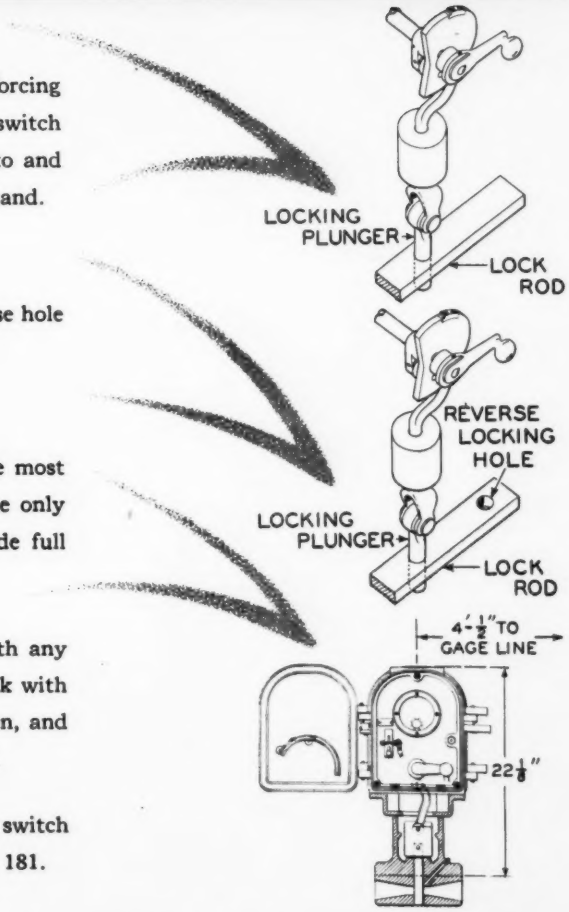
To add reverse locking, simply locate and drill reverse hole in solid lock rod, or use double-adjustable lock rod.

3. FITS CLOSE TO GAGE LINE

With a rail height of $6\frac{15}{16}$ inches above the ties, the most compact 9A lock can be installed with its centerline only 4 feet $\frac{1}{2}$ inch from the gage line—and still provide full A.R.E.A. track clearance.

You can use the Model 9A electric switch lock with any switch—or with any other device—that you can lock with a lock rod. It is easy to install, needs little attention, and can be operated from practically any energy supply.

For further information about the Model 9A electric switch lock, see your G-R-S district office. Ask for Bulletin 181.



GENERAL RAILWAY SIGNAL COMPANY

New York 17 Chicago 3 **ROCHESTER 2, N.Y.** St. Louis 1 A-2323

3 useful air tools for bridge maintenance

Tough jobs of scaling are handled quickly with the CP Triple Scaler. No chisels are required — the pistons act as chisels, hammering old paint, rust or scale without damaging the underlying surface.

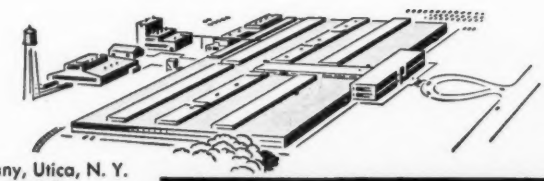
The Triple Scaler weighs only 7¼ pounds, has ½ inch stroke, and operates at 7,000 B.P.M.

For fast, safe nut-running, and the application or removal of bolts, studs or lag screws, and for screw spike driving use the powerful CP-365-RP Reversible Air Impact Wrench. No twisting or kickback, and little vibration, minimizes operator fatigue. The rotary impact action is controllable.

Capacity to 1¼" bolt size; over-all length 16¾"; weight 32 pounds.

Loose scale is rapidly removed from any metal surface with CP Wire Brush Machines. Models, with either straight or pistol grip handles, are available with a wide choice of radial and cup wire brushes. Operating speeds range from 4,200 to 9,000 R.P.M.

For further information send for a copy of SP-3008, Pneumatic Scaling Tools.



With its half million square feet of floor space, Chicago Pneumatic's new Utica unit is the world's most modern plant for the production of pneumatic and electric tools.

Chicago Pneumatic Tool Company, Utica, N. Y.

CHICAGO PNEUMATIC TOOL COMPANY

General Offices: 8 East 44th Street, New York 17, N. Y.

PNEUMATIC TOOLS • AIR COMPRESSORS • ELECTRIC TOOLS • DIESEL ENGINES
ROCK DRILLS • HYDRAULIC TOOLS • VACUUM PUMPS • AVIATION ACCESSORIES

ADDITIONAL INFORMATION

On Any of the Products Mentioned in This Issue

Below is a complete index of the products referred to in both the editorial and advertising pages of this issue. If you desire additional information on any of them, use one of the accompanying addressed and stamped postcards in requesting it. In each case give name of product and page number. The information will come to you directly from the manufacturer involved, without any obligation on your part.

Products Index

A

Acetylene ---- 432
Air Compressors ---- 426, 434, 438
Air Cooled Engines ---- 495
Aluminum Building Siding ---- 443
Aluminum Jacks ---- 489
Aluminum Paints ---- 443
Aluminum Products ---- 443
Anchors, Rail ---- 405, 412, 416
Arc Welders ---- 432
Axes ---- 412

B

Ballast Cleaners ---- 414, 415, 428
Ballast Forks ---- 412
Band Saws ---- 497
Blast Plates ---- 478
Blowers ---- 420
Bolts ---- 497
Bonding Drills ---- 408
Bridge Repairs ---- 421
Bridge Tie Anchors ---- 416
Brushes ---- 417
Building Siding ---- 443
Bulldozers ---- 433

C

Calcium Carbide ---- 432
Calipers ---- 494
Chain Saws ---- 420, 434, 492
Chemical Weed Killers ---- 429, 481, 484, 488
Chemicals ---- 417
Clamshell Buckets ---- 436
Clean Preservatives ---- 413
Corrosion Preventives ---- 425
Coal-Ore Bridges ---- 436
Cranes ---- 409, 422, 434, 436, 485, 490, 494
Crawler Cranes ---- 485
Crawler Tractors ---- 430, 431, 433
Creosote Sprayers ---- 477
Cribbing Machines ---- 414, 415
Curve Calculators ---- 476

D

Derails ---- 496
Diesel Electric Cranes ---- 436
Diesel Electric Locomotive Cranes ---- 422, 436
Diesel Engine Parts ---- 419
Diesel Engines ---- 419, 433, 438
Ditchers ---- 495
Draglines ---- 409, 485
Drainage Pipe ---- 410
Drills ---- 408, 438

E

Electric Chain Saws ---- 420
Electric Plants ---- 497
Electric Switch Locks ---- 437
Electric Tie Tampers ---- 411
Electric Tools ---- 434, 438
Electrodes ---- 432
Engines ---- 419, 495

F

Fasteners ---- 497
Flame Cleaning ---- 432
Flangeway Cleaners ---- 477
Flexible Shaft Grinders ---- 434
Frog Grinders ---- 427

G

Gas Cutting Machines ---- 432
Gas Welding Supplies ---- 432
Gasoline Engines ---- 495
Gasoline Tie Tampers ---- 408, 418
Generators ---- 420, 478, 497
Glass ---- 417
Grade Crossing Panels ---- 494
Grease ---- 500
Grinders ---- 427, 434
Grouting ---- 421
Grouting Outfits ---- 444
Guard Rail Bolts ---- 497

No Postage Stamp Necessary If Mailed in the United States

BUSINESS REPLY CARD
First Class Permit No. 32418, Sec. 510 P.L.&R. Chicago, Ill.

Postage Will be Paid by Addressee

RAILWAY ENGINEERING & MAINTENANCE
30 Church Street
New York 7, New York

READER SERVICE DEPT.

RAILWAY ENGINEERING AND MAINTENANCE May, 1950

Please send me additional products information as requested below.

☐ Literature Only ☐ Desire to see Representative ☐ Price Data

Product and Page No. .....

Name .....

Title or Position .....

Company .....

Address ..... City ..... Zone ..... State .....

(Please Fill Out Card in Full)

H

Hammers ---412
Hatchets ---412
Hydraulic Jacks ---487
Hydraulic Tools ---438

I

Impactors ---434

J

Jacks ---478, 486, 489

L

Lag Screws ---497
Lever Jacks ---489
Locomotive Cranes ---422, 436
Lumber, Pressure Treated ---493

M

Masonry Repairs ---421
Masonry Restoration ---421
Micrometers ---494
Mortar ---421
Motor Cars ---444, 477

O

Oilers, Rail Joint ---477
On-Track Cranes ---494
On-Track Tie Tampers ---414, 415
Oxy-Acetylene Flame Cleaning ---432
Oxy-Acetylene Service ---438

P

Pads ---441
Paints ---417, 443
Paving Breakers ---420
Pentachlorophenol ---413
Perforated Pipe ---410
Pipe ---410
Plastics ---417
Pneumatic Tools ---438
Portable Rollers ---492
Power Units ---433
Pressure Treated Wood ---493
Pull Shovels ---409
Pumps ---420, 491, 496, 497

R

Rail Anchors ---405, 412, 416, 424
Rail Coating ---425
Rail Cranes ---434, 494
Rail Drills ---408
Rail Fork Shims ---412
Rail Forks ---412
Rail Grinders ---427
Rail Joint Lubricators ---500
Rail Joint Oilers ---477
Rail Saws ---408
Rerailers ---476
Road Rollers ---497
Rock Drills ---438
Roller Bearings ---432
Rollers ---492
Rotary Pumps ---497
Rules ---494
Rust Preventives ---425, 446, 497

S

Saws ---408, 420, 434, 492, 497
Scoops ---412
Screw Jacks ---489
Scuffle Hoes ---412
Scythes ---412
Shovels ---409, 485
Siding ---443
Special Trackwork ---407
Sprayers ---434
Spreaders ---495
Spring Washers ---406, 424, 434, 475, 497
Switch Grinders ---427
Switch Locks ---439

T

Tampers ---414, 415, 418
Tapered Roller Bearings ---432
Tapes ---494
Telescoping Gages ---494
Tie Cutters ---477
Tie Drying ---479
Tie Pads ---441
Tie Plate Spacers ---477
Tie Tampers ---408, 411, 414, 415, 418
Timber Bolts ---497
Timber Conservation ---479
Track Jacks ---478, 486, 489
Track Shovels ---412
Track Tools ---424
Trackwork ---407
Tractor Attachments ---426, 430, 431
Tractor Shovels ---430, 431
Tractors ---426, 430, 431, 433
Treated Ties ---479
Truck Cranes ---485, 496

U

Unit Tie Tampers ---408, 418
Utility Grinders ---427

V

Vacuum Pumps ---438

W

Washers, Spring ---406, 424, 434, 475, 497
Water Test Kits ---446
Weed Burners ---477
Weed Cutters ---412
Weed Killers ---429, 481, 484, 488
Weed Killing Service ---481, 488
Welded Rail ---488
Well Water Systems ---497
Wood Preservation ---413, 494
Wood Preservatives ---479, 494
Work Equipment ---444
Wrecking Cranes ---438

RAILWAY ENGINEERING AND MAINTENANCE

May, 1950

Please send me additional products information as requested below.

☐ Literature Only ☐ Desire to see Representative ☐ Price Data

Product and Page No. .....

" " " .....

" " " .....

" " " .....

Name .....

Title or Position .....

Company .....

Address ..... City ..... Zone ..... State .....

(Please Fill Out Card in Full)

Postage Will be Paid by Addressee

BUSINESS REPLY CARD

First Class Permit No. 2348, Sec. 510, P.L.&R. Chicago, Ill.

No Postage Stamp Necessary If Mailed in the United States

RAILWAY ENGINEERING & MAINTENANCE

30 Church Street

New York 7, New York

READER SERVICE DEPT.

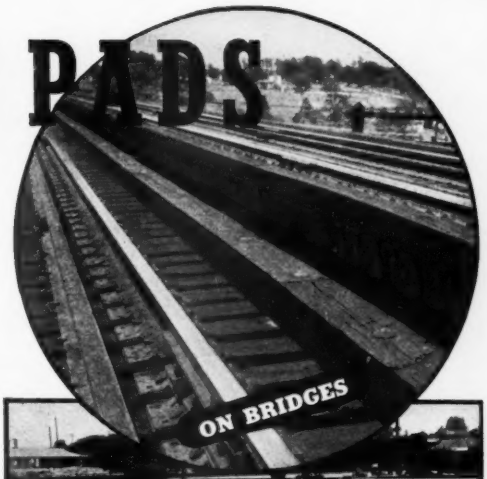
FABCO TIE PADS

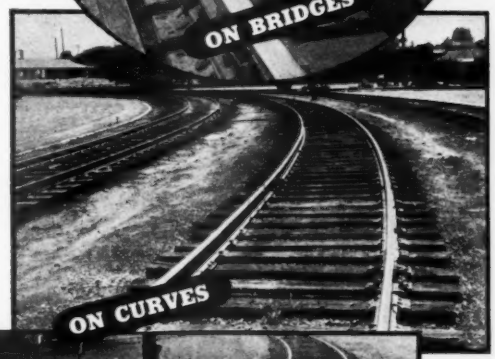
REDUCE MECHANICAL WEAR OF TIES

By reducing the plate cutting of ties Fabco Tie Pads save you money in two ways. (1) They extend tie life. (2) They reduce to a minimum the need for regauging.

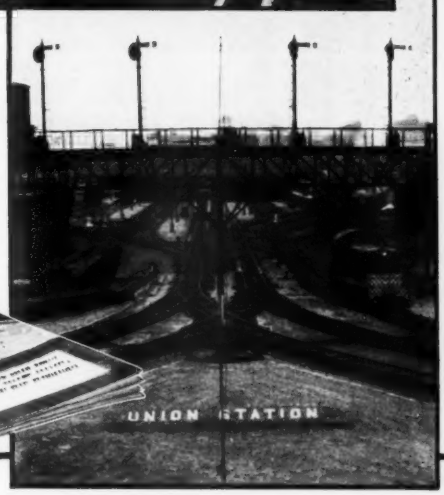
17 REASONS WHY YOU SHOULD USE FABCO TIE PADS

1. Prevent cutting of ties by plates.
2. Extend tie life.
3. Reduce labor costs by less frequent tie renewal.
4. Maintain gauge.
5. Save labor of regauging.
6. Have exceptionally long life — comparable to tie life.
7. Withstand extremes of temperature, moisture, brine, sand.
8. Have great strength under load.
9. Do not squash or crush under extremes of temperature or long service.
10. Permanent resiliency assures tight spikes.
11. Resilient winter and summer.
12. Cushion track structure from impacts.
13. Assist in maintaining line and surface.
14. Large tie plates unnecessary.
15. Compensate uneven bearing surfaces.
16. May be transferred from one location to another.
17. Low pad cost.





and **STATION APPROACHES**



Made by the Makers of Fabreeka with over 15 Years Experience in Track

FABREEKA
PRODUCTS COMPANY
INCORPORATED
222M SUMMER STREET
BOSTON 10, MASS.

NEW YORK — PHILADELPHIA
DETROIT — SPARTANBURG
CHICAGO — OAKLAND

Please send me latest Fabco Tie Pad literature.

NAME.....

FIRM.....

ADDRESS.....

No. 257 of a series

Railway Engineering and Maintenance

SIMMONS-BOARDMAN PUBLISHING CORPORATION

79 W. MONROE STREET
CHICAGO 3, ILL.

Subject: Our Editorials

May 1, 1950

Dear Readers:

One of the most difficult of the many duties an editor has is the writing of editorials. I think it is safe to say that the average editor would rather write a full-length feature article—maybe even several of them—than a single editorial less than a column in length. Almost invariably the task of writing the monthly editorials is put off until the deadline is perilously close, and is approached with all the enthusiasm of a small boy who has been drafted to help with the spring housecleaning.

Why this attitude toward what appears, superficially at least, to be a relatively simple task? When writing a descriptive article regarding some maintenance operation the editor is merely acting as a reporter and his principal concern is to be sure he is presenting the facts correctly. Editorial writing, on the other hand, is an exacting form of creative writing. The writer must present his own ideas and opinions on some subject of current interest, he must say something significant, what he says must have an authoritative ring, and he must say it in an interesting manner. The necessity of fulfilling all these requirements is what makes editorial writing an arduous duty—but at the same time a challenging one that has its compensations.

Last month we printed an editorial, written by Henry Michael, on the subject of rail anchorage. A number of readers have written us about this editorial, some approving of the viewpoint presented and others expressing disagreement. But it isn't the tone of the letters that is significant—and gratifying—it's the fact that the editorial struck sparks in the minds of our readers, stimulating them to an expression of their own opinions on the subject.

An editorial, since it expresses the opinion of one of the editors, frequently on some controversial subject, should cause some kind of a reaction in the mind of the reader. If it doesn't, the chances are that it is lacking in one or more important respects. On the other hand, if the reader is sufficiently impressed with the editorial he may take time to put his ideas into a letter to the editor. Hence, these letters from readers are a measure of the success of our editorial effort. The more of them we receive the more certain we are that our editorials—and articles—are dealing with ideas and subjects of interest and value to you.

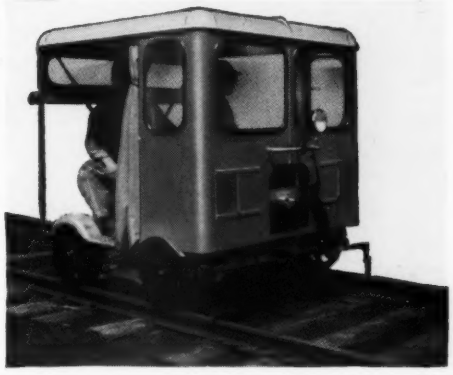
Yours sincerely,

Merwin H. Dick

MHD:ag

Editor

Let ALUMINUM lighten the job!



It's good business to save trouble for your "trouble-shooters". Aluminum equipment can help you do it.

Take these up-to-the-minute inspection cars—built by Fairmont Railway Motors, Inc., Fairmont, Minn. They make extensive use of Alcoa Aluminum Sheet, Extrusions and Castings. Because aluminum is light in weight, cars handle easily. Thick sections add strength, durability. Upkeep is low, because aluminum *lasts*, resists corrosion.

Let *aluminum* lighten the job! Before you buy, ask your supplier about maintenance tools and equipment made of Alcoa Aluminum. You'll speed the work, save effort, cut costs. ALUMINUM COMPANY OF AMERICA, 1820E Gulf Building, Pittsburgh 19, Pa. Sales offices in principal cities.

ALCOA FIRST IN ALUMINUM ...THE METAL THAT *LASTS*

ALCOA ALUMINUM

INGOT • SHEET & PLATE • SHAPES, ROLLED & EXTRUDED • WIRE • ROD • BAR • TUBING • PIPE • SAND, DIE & PERMANENT-MOLD CASTINGS • FORGINGS • IMPACT EXTRUSIONS
ELECTRICAL CONDUCTORS • SCREW MACHINE PRODUCTS • FABRICATED PRODUCTS • FASTENERS • FOIL • ALUMINUM PIGMENTS • MAGNESIUM PRODUCTS

Fairmont

RAILWAY MOTOR CARS
AND WORK EQUIPMENT

. . . saves time and money on the roadbed

All Fairmont equipment is designed with the *job* in mind—that's the basic reason why Fairmont Motor Cars and all other Fairmont equipment are rated number one for efficiency and dependability wherever rails run. Typical of these basic qualities is Fairmont's Grouting Outfit (W65 Series A) which is complete, compact, simple and highly portable. It is adaptable to any grouting program—large operations or spot grouting. This dependable Outfit will save you time and money wherever it is used and it will prove once again that *performance on the job counts!*

Performance
ON THE JOB
COUNTS

FAIRMONT RAILWAY MOTORS, INC., FAIRMONT, MINNESOTA

Railway Engineering and Maintenance

NAME REGISTERED U. S. PATENT OFFICE

Published on the first day of each month by the

SIMMONS-BOARDMAN PUBLISHING CORPORATION

79 West Monroe St., Chicago 3

•

NEW YORK 7,
30 Church Street

WASHINGTON, D.C., 4
1081 National Press Bldg.

CLEVELAND 13,
Terminal Tower

SEATTLE 1,
1914 Minors Ave.

LOS ANGELES 13,
816 West Fifth Ave.

DALLAS 4,
2909 Maple Ave.

•

Samuel O. Dunn, *Chairman of the Board*; James G. Lyne, *President*; C. Miles Burpee, *Vice-President*; C. W. Merriken, Jr., *Vice-President*; H. H. Melville, *Vice-President*; Robert E. Thayer, *Vice-President*; H. E. McCandless, *Vice-President*; John R. Thompson, *Vice-President*; J. S. Crane, *Vice-President and Secretary*; John T. DeMott, *Treasurer*.

•

Subscription price in the United States and Possessions and Canada, 1 year $2, 2 years $3; other countries in Western Hemisphere, 1 year $5, 2 years $8; all other countries, 1 year $7, 2 years $12. Single copies, 50 cents each. Address H. E. McCandless, Circulation Manager, 30 Church Street, New York 7, N.Y.

Member of the Associated Business Papers (A.B.P.) and of the Audit Bureau of Circulations (A.B.C.), and is indexed by Engineering Index, Inc.

PRINTED IN U.S.A.

VOL. 46, NO. 5 MAY, 1950

Editorials ---- 447
Development Work—Business Cars—Better Concrete

Renewing Girder Spans a Ticklish Job ---- 449
C. E. Sloan describes a project on the Baltimore & Ohio which posed some difficult problems in planning and execution

Vapor-Dried Crossties After Six Years of Service ---- 453
A report on the expansion and improvement of Taylor-Colquitt facilities for artificially seasoning wood in a few hours

An Icing Platform Takes a Ride on the Rock Island ---- 456
Tells how this road economically relocated a large timber structure by transporting it in sections on a specially-prepared flat car

N. & W. Adopts Grouted Highway Crossings ---- 458
Presents details of a noteworthy design chosen by this road about three years ago for use when rebuilding important intersections

Auto Radio Saves Supervisor's Time ---- 460
Describes an installation on the Chicago, South Shore & South Bend, which provides a means of "stopping trouble before it starts".

Chemical Weed Control Proves Successful on the Boston & Maine ---- 462
Outlines the present practice of this road in inhibiting the growth of undesirable vegetation along its right of way

Oil Tanks Protected by Automatic Fire Department ---- 464
Gives details of an air-foam system on the Pennsylvania which, without human attention, safeguards storage facilities at Lucknow, Pa.

Test Specimens Emphasize "Do's" and "Don'ts" of Concrete Making ---- 466
Abstract of a paper presented by G. H. Paris before the A.R.E.A., dealing with a study now in progress by the Portland Cement Assn.

What's the Answer? ---- 469
Assuring That Machines Clear Trains
Effect of Diesels on Rail Damage
Temporary Trestles at Washouts
Fire Prevention and the 40-Hr. Week
Pumps for Handling Fuel Oil
Repairing Worn Stair Treads
Failures of Switch Throw Rods

Products of Manufacturers ---- 476

The Month's News ---- 480

MERWIN H. DICK, Editor
JOHN R. THOMPSON, Business Manager
WALTER L. TURNER, JR., Eastern Editor
HENRY E. MICHAEL, Associate Editor
RADFORD E. DOVE, Associate Editor
NORRIS V. ENGMAN, Associate Editor

NOW! A SIMPLE, FAST, INEXPENSIVE TEST FOR CHROMATE CONTENT OF DIESEL COOLING WATER!

Dearborn Chromokit consists of: (1) Four convenient-sized sample bottles with calibrated dropper; (2) 20 chemically treated test cards perforated to provide 80 tests; (3) Color standard chart; (4) Treatment adjustment chart; (5) Complete instructions for use of Chromokit; and (6) Sturdy Chromokit case.

NEW! DEARBORN CHROMOKIT PUTS CORROSION ON THE SPOT

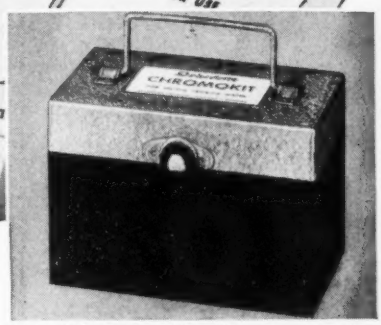
Diesel maintenance men know the high cost of repairs and down time that arise from mechanical failures. One common cause is improper cooling water conditioning which results in corrosion on cylinder liners, heads, engine blocks, engine frames and water passages. For peak operating efficiency, cooling water must contain chromate treatment and be checked frequently to maintain desired strengths.

A new development—the Dearborn CHROMOKIT—makes it easy to keep chromate concentrations constant, eliminate corrosion. It is a compact, self-contained portable unit which gives accurate indication of chromate strengths by means of chemically impregnated spot test cards. This method eliminates the time-consuming laboratory tests, costly equipment. It provides easy to learn, low cost testing—on the spot. The CHROMOKIT—already in use on 20 leading railroads—is the most accurate, most rapid field test method available.

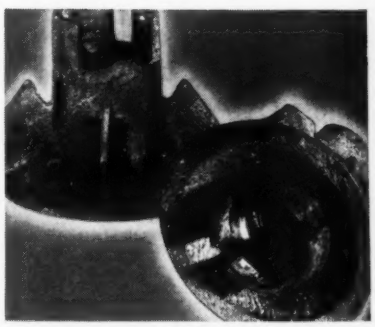
THIS IS ALL YOU DO

1. With the dropper bottle provided take a sample of the cooling water.
2. Place one drop in blank area on the printed side of the chemically treated test card.
3. After two minutes, match the color of the spot against the standard color guide provided. This gives actual chromate strength present.
4. Check against Treatment Adjustment Chart and add treatment in quantities indicated. Chart covers cooling systems from 50 to 300-gallon capacities.

That's all there is to it. The Dearborn Chromokit makes it easy, inexpensive and accurate! It's compact! It's convenient! It's simple! Requisition one today. Detailed instructions for use are included.



Compact! The Dearborn Chromokit measures only 5¾ x 3¼ x 3¾ inches overall. Lightweight!



Corrosion on this diesel engine pump impeller resulted from improperly treated cooling water. Dearborn Chromokit and Dearborn Chromate Formula 517, regularly applied, eliminate corrosion.

DEARBORN CHEMICAL COMPANY

General Offices: 310 South Michigan Avenue • Chicago 4, Illinois

Dearborn

TRADE MARK REGISTERED

THE LEADER IN WATER TREATMENT AND RUST PREVENTIVES

REQUISITION YOUR DEARBORN CHROMOKIT

COMPLETE PRICE **$7.50**

Additional packs of 20 Test Cards supplied at nominal cost depending upon quantity

Development Work —

Is at New Peak in Maintenance Field

Railway maintenance officers may or may not realize it, but the fact is that they and the activities of their departments are, at the present time, the center of more attention from sources within and without the railroads than has ever before been bestowed upon them. The basic cause of this heightened interest is found in the sharp increases that have occurred in the wage rates of maintenance labor in recent years. Within the railroad organizations themselves the greater interest in maintenance matters is due to the increased pressure for effecting labor economies that has been created by the higher wage rates. Outside the railroads, on the other hand, the increased interest is primarily noticeable on the part of persons and companies who are viewing the present situation as an opportunity to profit by building better mouse traps—that is new products that will win acceptance through their ability to cut costs.

There practically never has been a time when there wasn't a demand for new or better machines and products for reducing maintenance costs. And there never has been a time when there wasn't at least some development work going on along these lines, both on and off the railroads. But such activity at present is noticeably greater than at any time during at least the last 25 years. The word seems to have gotten around that rich rewards await those who are successful in developing machines for saving labor in maintenance work or products that will enhance the durability of the track structure.

During the last several years a number of companies, heretofore unknown in the maintenance field, have entered this field with new or improved machines or other products. At least several other companies are quietly investigating the possibilities for new equipment for performing track-maintenance operations. Even foreign concerns have become interested; the other day a representative of an European railway came into the office to get advice about the possibilities for selling in this country an ingenious new track fastening that was being used with success on his road. Furthermore, there is evidence of greater activity on the part of railroad men themselves—track foremen, supervisors and even higher officers—in developing new machines and devices for increasing the effectiveness of the maintenance forces.

What is the significance of this intensified activity? In the first place, it is an example of free enterprise in action—the striving of individuals to make a profit for themselves by using their ingenuity to develop something for which there is an economic need. Secondly, it means that maintenance men, to an increasing extent as time goes by, will be faced with the necessity of evaluating the economic worth of the new developments that are certain to result from this activity. Undoubtedly, some of these developments, for one reason or another, will not "make the grade," but others will, and in so doing will augment the growing array of weapons available for fighting high costs.

BUSINESS CARS —

Are a Problem for the Supervisory Forces

RAILWAY business cars are grand old institutions which serve a necessary function, but certain practices in connection with their use can bear more intensive study—particularly as they apply to the maintenance-of-way forces.

The spring parade of business cars has already begun. Railway officers desiring to obtain first-hand information as to how the tracks and structures have weathered the winter, are either already out on the line or are making plans for inspection trips. How many such officers stop to think of how easy it is for such trips to become "millstones" about the necks of their supervisory personnel?

Most men of supervisory rank recognize the need for higher officers to make inspection trips in their business cars at periodic intervals. They welcome the opportunty of riding in these cars and of benefiting by any constructive criticism voiced by their superiors. Some of them develop the ability to "take it" when they get their "ears pinned back" on such occasions. However, it is doubtful if any of them enjoy such criticism. It is in endeavoring to avoid these experiences by keeping their "skirts clean" that many of them institute practices that, although accomplishing the momentary purpose of alleviating criticism, react to the disadvantage of themselves and their railroads.

For instance, when notice is received that a business-car trip is scheduled over a line, almost every local supervisory officer can think of myriads of things, some actual and some imagined, that could be complained about. To eliminate all possible complaints would invariably take more men than are ever available in any territory—especially on track sections. What's to be done? The answer, too often, is to impress the extra gangs into the "preparedness" program. Even though such gangs are engaged on programmed work that can be completed by fall only if they apply themselves to it every day, the reasoning is that it is better to take a chance on this work not being completed than it is to run the risk of being criticized during business-car trips.

Therefore, to reduce or eliminate the possibility of complaints, extra gang forces are sometimes taken from their regular work and assigned to do anything from policing stations grounds, cleaning ditches, piling ties and lining curves to spot-surfacing the very track that is scheduled to be raised out-of-face later. Admittedly, in such instances they may do some more work that they are scheduled to do anyway but only a minor part of it falls in this category. The largest part of it may be classed as "polishing" work.

During a season in which the business-car parade was particularly heavy, one supervisor estimated that, had he kept his forces on productive work instead of using them to prepare for these inspections, he would have raised 10 more miles of track than he did. This is a high price to pay for small commendation in place of possible criticism.

What is the solution? Some will say that efficient subordinates should keep the track and property always in a condition that will bear inspection by their superiors. This attitude is reminiscent of the husband who suggested to his wife that, if she kept house properly, she would not have to make any extra effort in preparing for the guests he brings home to dinner. The parallel is that this husband expected the house to be in perfect order at all times. Such perfection seems impractical on both railways and in homes.

Would it not be better if subordinate supervision, as hosts, could receive the occupants of business cars as guests for whom they would not have to "put up a front", but to whom they could offer "pot-luck" dishes of normal maintenance operations", and point with pride to the lasting improvements they were making to the property?

BETTER CONCRETE —

A.R.E.A. Committee Points the Way

MANY of the railway projects involving the use of concrete are small—culverts, headwalls, bridge seats, station platforms, etc.,—and are carried out under the direction of masonry foremen and bridge and building supervisors who have risen from the ranks, or young engineers from the division or other offices. Too often these men have learned from experience only and do not have a real understanding of the fundamentals of proportioning, mixing, placing and curing concrete that assure a durable product. While many text books and manuals on this subject are available, the technical terms and expressions therein are no doubt bewildering to many of these men, however great their desire for knowledge may be.

There can be no argument that much of the concrete placed by railway forces has been of inferior quality and the causes cited above may well be responsible. The cost of repairing and replacing this concrete over the years would, if known, be staggering.

It is gratifying to learn that the American Railway Engineering Association, through its Committee on Masonry, has taken note of this situation, as demonstrated by the committee's most recent report. This report includes a Guide to the Water-Cement Ratio Method of Making Concrete, which explains the basic principles of concrete manufacture and does so in simple, non-technical language. The text of the guide and the charts, graphs and illustrations that accompany it are designed to stimulate the interest of the younger foremen, inspectors and engineers toward a better understanding of this subject.

Presented as information at the recent A.R.E.A. convention, this guide will no doubt be resubmitted next year for final approval and publication. It is to be hoped that the railroads will lose no time in obtaining copies as soon as they become available.

Renewing Girder Spans A Ticklish Job

Careful advance planning and equal care in doing the actual work were required when the Baltimore & Ohio recently replaced the obsolete through girder spans of its bridge across the White river with deck-girder spans. The nub of the problem was the handling of spans 89 ft. long and weighing 82 tons with a single derrick car. The background of the project and the method used in carrying it out are described herein.

Maneuvering new Span No. 5 into final position

By C. E. SLOAN
Engineer of Bridges
Baltimore & Ohio, Baltimore, Md.

• Some difficult problems in planning and execution confronted the bridge forces of the Baltimore & Ohio recently when they were faced with the task of replacing a multiple - span through - girder bridge with a deck-girder structure. The project came about as the result of two related improvements at Riverdale, Ind., 120 mi. west of Cincinnati, Ohio, on the line between the latter point and St. Louis, Mo. At Riverdale the line crosses the East fork of the White river and, 1.32 mi. farther west, crosses a tributary stream known as Mill creek, and then ascends a three-mile grade known as Mitchell hill.

This particular section of the line, which is single track, was known originally as the Ohio & Mississippi, and was opened to traffic in 1857. Mitchell hill, imposing a grade of 1.07 per cent, has long been the ruling grade for westbound trains. In former years freight trains would sometimes "double the hill," making two trips with the load.

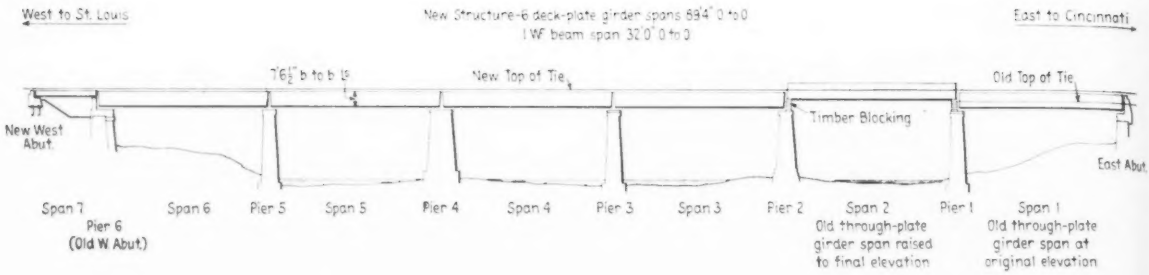
The first of the improvements was carried out at the Mill Creek crossing, and was primarily a change in alinement, although it was brought about originally by the necessity for renewal of a badly deteriorated bridge over that stream. The line improvement consisted of a reduction of the grades and curvatures on the first mile or more of Mitchell hill. The second improvement was the renewal of the superstructure and the strengthening of the foundations of the White river bridge, making it possible to remove a very troublesome speed restriction at the bottom of the hill. Combined, the two projects make it possible for westward freight trains to go up the hill with an increased load of at least 400 tons over that previously handled.

The former Mill Creek bridge was a short distance west of the bottom of the hill and near the center of a 5-deg. 30-min. curve which limited the safe speed to 45 m.p.h. The bridge was a 65-ft. deck-girder span, with a heavy concrete-slab deck, supported on two stone abutments, about 44 ft. high. The abutments had deteriorated badly and relieving bents had been placed under the girders as a safety precaution some years ago. The masonry continued to deteriorate and it became apparent that, if the bridge was to be kept in service, it would be necessary to renew the abutments, in spite of the safety factor gained by the speed restriction imposed by the curvature. This restriction, of course, made it difficult for tonnage trains to gain momentum for the hill.

History of White River Bridge

The type of structure used for the first bridge over the White river is not known, but in 1872 this crossing included three Phoenix truss spans, each about 178 ft. long, supported on two large stone piers and two abutements. In 1892, three new limestone piers were added and the trusses were replaced by six through girder spans, each 88 ft. 6 in. in length. These remained in service until changed out in the recent project.

These girder spans, perhaps because of some peculiarity in the specifications or design load, were particularly deficient in the length of the cover plates. The lateral bracing was composed of rods which extended to seats through holes in the girder webs. Sole plates and masonry plates without pins or provision for deflection were the only measures used for bearing, and this caused serious deterioration of the masonry in the



Elevation of Baltimore & Ohio's White River bridge. Spans 1 and 2, respectively, show the old through girders at the original position and after being raised to bring track to new grade. Remainder of spans show new deck girders in place

recent past. The details of the floor system were not only of poor design, but the parts had been badly affected by brine drippings. The girders were spaced on very close centers, with lateral clearances that were far below today's standards. The tops of the stone piers, especially the two older ones, and the abutments had suffered heavily, as mentioned above, and were in need of extensive repairs. Because of these various deficiences, severe speed restrictions of 25 m.p.h. for passenger and 15 m.p.h. for freight trains were placed in effect on the bridge in the spring of 1949.

Relocation at Mill Creek

The condition of the substructure of the Mill Creek bridge and the necessity of at least a small change in alinement led to a study of a more substantial change. The study showed that, by crossing several hundred feet upstream from the old bridge, the curvature could be reduced from 5 deg. 30 min. to only 1 deg. 55 min. The length of the track would be shortened about 800 ft., but, in its effect on the grade, this would be more than compensated for by moving the east end of the grade about ½ mi. farther east.

This improvement involved about 200,000 cu. yd. of excavation, the construction of 4,400 ft. of new track, and the removal of about a mile of old track. A double 8-ft. by 8-ft. box culvert was built to carry Mill creek under the new embankment. The old bridge was left standing because the heavy deck slab made the salvaging of the steel uneconomical. Grading and culvert work on this project was carried out by the Empire Construction Company, Baltimore, Md., and was completed in August, 1949.

When the decision to relocate the Mill Creek crossing was reached, it was also decided to make extensive changes to the White River bridge. Otherwise, the operating advantages gained from the line change would be largely offset by the slow orders on this bridge. Accordingly, a plan was adopted which called for repairing the old piers and abutments and erecting new deck-girder spans of modern design, at the same time establishing a new grade 5 ft. 5 in. above the existing grade. Steel for the new bridge had been ordered and the work of raising the track and repairing the masonry was well under way by the time the work at Mill creek was completed.

Masonry Repairs

The substructure repairs and alterations at the White River bridge were carried out in two phases, the first of which involved pressure grouting the old masonry. This work was performed by the George E. Detzel Company, Cincinnati. The older units required extensive grouting, replacement of some of the face stones and cement-gun work. The newer piers, built in 1892 of Bedford limestone, were in much better condition and accepted an almost negligible amount of grout.

The second phase involved raising the existing bridge to the new grade, building a new bank abutment, and repairing or replacing the bearing courses of the piers and abutments. This work was all done under traffic, but favorable weather conditions prevailed, making it possible to adhere closely to a pre-arranged schedule.

The wingwalls of the east abutment, which are parallel with the track, were built up to the new elevation with concrete and held together with reinforced concrete ties extending beneath the track. The wings of the old west abutment, however, were found to have bulged badly, and it was necessary to remove part of the fill between them. A new bank abutment was constructed back of the older one and the breast of the old abutment was so altered as to make it function chiefly as a pier. A 31-ft. 6-in. beam span was erected between the new and old abutments.

The work of raising the old spans was carried out in steps, with timber blocking being placed to support them. This blocking was arranged so that it could be cut through readily on the transverse center lines of the piers to permit removal in halves for placing the new spans directly on their shoes.

Why Deck Spans Were Used

Deck-girder spans were selected for this structure for several reasons. Among these were the smaller amount of steel required, the limitation imposed by the short length of the newer group of piers as regards lateral clearances of through spans, and the location of the bridge at a dip in the grade. Most important, however, was the fact that a modern span of the through type would have been too heavy and cumbersome to be handled as a unit in this location, unless it could be rolled into place, which would have entailed great expense.

The road's maintenance forces completed the work of raising the approaches to the bridge and raising the old spans about the middle of November, 1949. They had also received and unloaded the steel work, which had arrived in August, and stored it in the immediate vicinity of a construction siding, which had been built a few hundred feet west of the bridge.

The erection equipment arrived on December 1, and the work of assembling the new spans and placing the timber decks was begun promptly. The new spans were assembled and placed one on top of the other alongside the main

Left—In preparing for the new deck girder spans, the through girders of the old structure were raised on blocking to bring track to new grade. The old piers were strengthened by grouting. Above—The new spans were assembled in the field. Then, complete except for the rails, they were stored as shown here

Above—Lifting out one of the old through girder spans with the derrick car. The crane at the left is salvaging the deck of the old span. Right—Moving one of the new deck girder spans on the push car from the storage point to the loading platform, where it remained until placed in final position

track and opposite the siding. This work was completed on December 23.

Meanwhile a loading platform for the temporary storage of one new span at a time was built near the west end of the bridge and a similar platform for the receipt of one of the old spans was built on the opposite side of the track. Rails, cut to exact length, were prepared so that, when those on the old spans were removed, short pieces could be placed to bring both rails up to the very end of the span on which the derrick car would stand while changing the spans.

The six new girder spans were designed for Cooper's E-72 loading, and in accordance with the most recent A.R.E.A. specification for impact. They are each 89 ft. 4 in. long and as lifted into place, including the bridge ties and guard rails, were calculated to weigh 82 tons each; the steel alone weighed 64 tons.

In preparation for changing out the spans the short length of track over the approach to the bridge, between the storage platforms and the west abutment, was "corduroyed" by placing an additional crosstie between each pair of the existing ties to prevent settlement of the new fill under the heavy loads on the front truck of the derrick car when carrying a span between the platforms and the end of the bridge.

A day or more in advance of the time for installing a span it was picked up from the storage piles by the derrick car, loaded on a heavy-duty push car, and moved to the storage platform, where it remained until ready for the changeout next day.

Old Span No. 6, at the west end of the bridge, extended over dry ground, and was the first to be removed, the date being December 28, 1949. The entire weight of

Looking east over bridge after west beam span and four main spans had been placed

76 tons, including deck, was picked up, turned transversely to the track, and lowered directly to the ground for dismantling. New Span No. 6 was next removed from the loading platform, placed on the push car, and moved eastward as near to the end of the bridge as possible. Here it was picked up at boom radius of about 53 feet, turned transversely to the track, and the push car was removed. The span was set down on the track, and the derrick car was then brought forward until the front truck was supported on new beam Span No. 7. Here the span was again picked up with a short boom radius, and moved as close to the opening as possible. Then the car was blocked, the boom lowered to the 53-ft. radius, and the span was rotated to a position parallel to the track before lowering it to the final position on its shoes. All six of the new spans were handled in this manner, using a push car while on the fill, and moving along with the load held at short radius when the derrick car was taking it across the new bridge.

The load on the six-wheel front truck of the derrick car when traveling with the load was about 380,000 lb. and when placing the span this was increased to about 450,000 lb.

Old Spans Nos. 5 to 1, inclusive, were taken back to the unloading platform on the push car after removal. This car was brought out ahead of the derrick car, the boom of which extended over it for the lift of 64 tons with deck removed. A locomotive crane, property of the B. & O., working east of the span being taken out, was used to remove the rails and as much of the deck as could be reached by the boom before the span was lifted out. The remainder of the deck was dumped into the river to save time. After the old span was removed, this crane took out the west half of the blocking, which had previously been sawed through, and then shifted the new shoes to the proper position for receipt of the new span.

Changing out Spans

A period from 10:40 a. m. to 2:25 p.m. was selected for changing the spans, because it involved no interference to passenger trains, and arrangements were made with the operating department to schedule freight trains outside of this period on the change-over days. It was difficult to fix in advance a date for the changeover, because of weather conditions. A high wind would introduce complications in handling the spans, since the outriggers of the derrick car could not be blocked to the narrow decks of the new spans, making it impossible to counteract lateral forces set up by the wind. Winds caused the postponement of changeovers on several occasions.

Spans 5 and 4 were changed out on the 29th and 30th of December, respectively. A period of bad weather prevailed until January 5, when Span 3 was removed. Weather again interfered and Span 2 was not changed until January 11. Span 1, the final span, was changed on the following day. Span 6 required 2 hr. 52 min.; the remainder were placed in an average of 2 hr. 41 min., counting from the passage of the last train until the new track was in place on the newly placed span.

Although old spans 1 to 5, inclusive, were carried back to the unloading platform, the additional travel and handling did not appear to require a greater length of time as the technique improved. The last span required 47 min. less time to place than the first.

It may be of interest to give the time consumed in the various operations of changing out Span 4, since its change-over time happens to be the average of the 5-span group. These operations and time periods, together with maximum and minimum periods for the entire group are shown in the accompanying table.

Times, in Minutes, Required for the Various Operations in Renewing the White River Bridge

	Span 4	Maximum Spans 1 to 5	Minimum Spans 1 to 5
Time from passage of last train until short rails were in place at end of last new span erected	9	13	8
Time to remove ties and decking	13	22	10
Time to lift old span and load on push truck	13	21	11
Time to travel and unload old span	19	19	13
Loading new span on push truck	24	24	12
Moving new span to bridge	4	11	4
Lifting span from push car and landing it on track	17	23	10
Removing push truck, picking up span again and landing it on shoes	30	44	26
Building track	32	37	24

Renewal of this bridge eliminates the weight and clearance restrictions formerly in effect here, in addition to making possible full realization of the benefits of the work at Mitchell hill.

The line change and bridge-renewal projects described in this article were planned and executed under the general direction of A. C. Clarke, chief engineer of the B. & O., Baltimore, Md., and the writer. The field work was under the direction of J. P. Ray, regional engineer, Cincinnati, with S. A. Graham, serving as assistant engineer at the site. Maintenance forces were directed by J. W. Purdy, engineer maintenance of way, Cincinnati, and P. W. Elmore, division engineer, Washington, Ind. A. J. Wegmann, chief bridge inspector, covered the replacement of the superstructure for the engineer of bridges. The new spans were assembled and erected by the American Bridge Company.

Left—These vapor-dried ties on the Asheville division of Southern, which have now been in service more than 6 years, show an appreciable reduction in checking and splitting compared with...

. . . the air-seasoned ties shown below, which originated in the same general production area, and which were treated with the same preservative and placed in same track at the same time

Crossties seasoned by the vapor-drying process, which have now been in service six and a half years, show an appreciable reduction in checking as compared with air-seasoned ties. Three additional plants have now been equipped to utilize this process, and the parent plant at Spartanburg, S. C., including the research facilities, has been reorganized.

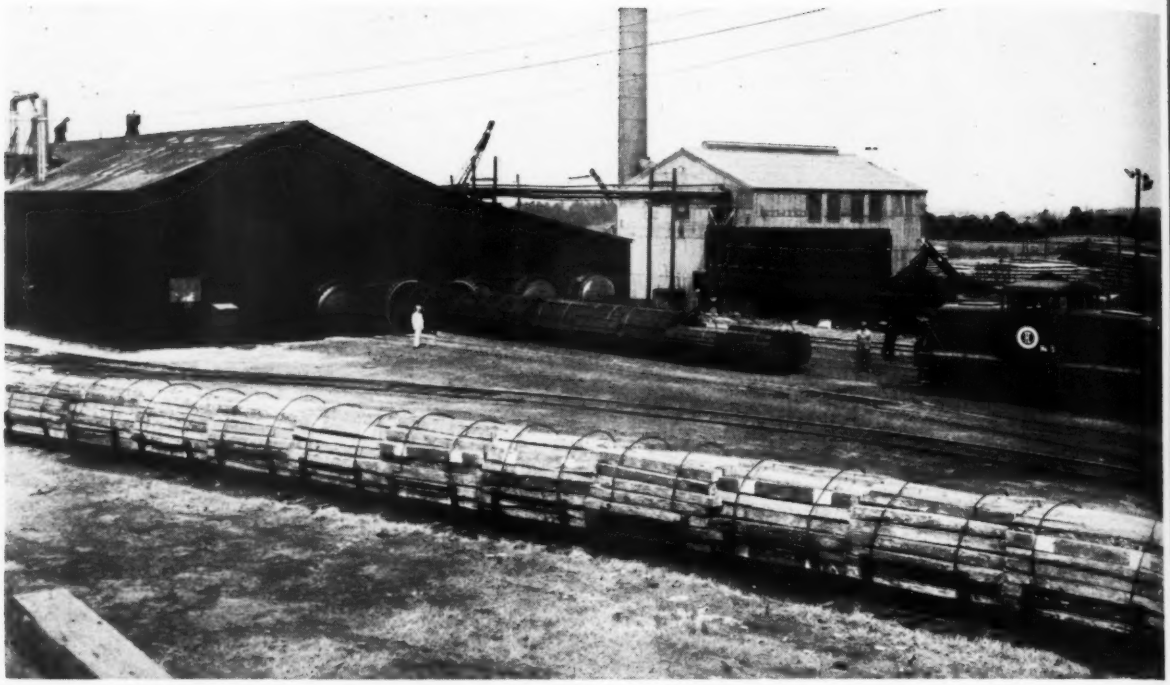
VAPOR-DRIED CROSSTIES

After Six Years of Service

• Longer service life and lower annual costs for crossties, together with satisfactory utilization of less desirable species through the vapor-drying process, are the objectives of primary interest to railway maintenance men in conjunction with the revamping and reorganization of the wood-preserving plant of the Taylor-Colquitt Co. at Spartanburg, S. C., recently completed at a cost of some $750,000. All of the plant's 25 years have been marked by steady progress in research and the design and development of machines and methods for the production of better and more efficient products. Among the most interesting and promising developments is the method for artificially seasoning wood, known as the vapor-drying process, which was described in the April, 1946, issue of *Railway Engineering and Maintenance*. Now, after five years of commercial production at the parent plant, three additional plants have been equipped for vapor-drying, that of the Norfolk & Western at Radford, Va., and two in New Zealand and Australia. Both "down-under" plants are for drying lumber for general purposes. Operating experience during the last five years has resulted in a number of improvements which have materially simplified the equipment required for the conversion of treating cylinders to perform the additional duty of vapor-drying. The new and renovated plants have been equipped accordingly.

Under Test on 11 Roads

Eleven railways in the United States have installed vapor-dried crossties of oak, hardwoods and gum in tracks for test purposes. The oldest of these have been in service for six and one-half years on the Asheville division of the



View of Taylor-Colquitt's wood preserving plant showing the new 44-ton General Electric Diesel locomotive pulling a charge of treated crossties from one of the treating cylinders. In foreground are ties from adzing and boring mill, loaded on trams and ready for treatment

Southern. Because of the unique method of relieving seasoning stresses, these ties show an appreciable reduction in checking compared with air-seasoned ties from the same general production area, that were treated with the same type of wood preservative and placed in the same track at the same time.

In considering the adoption of the vapor-drying process, which reduces the seasoning period of crossties from a matter of months to a few hours, one railway, for instance, made a thorough and careful investigation which revealed estimated immediate annual savings of $45,000 on the vapor-drying treatment of 600,000 hardwood crossties. These estimates included plant depreciation and upkeep costs for a $216,000 vapor-drying installation for two treating cylinders.

Process Extends Service Life

In addition to these immediate annual savings, railway engineers also estimated that the new process will add a minimum of three years service life to the crossties, compared with air-seasoned stock. Proceeding on the basis of treating 600,000 hardwood ties each year, the railway estimate concluded that, by reason of the added life and the scaling down of seasoning and treating costs, vapor-drying would result in a saving of $8,400 the first year, $16,800 the second year, $25,200 the third year, etc., or an average annual saving of $126,000 per year for a period of 29 years.

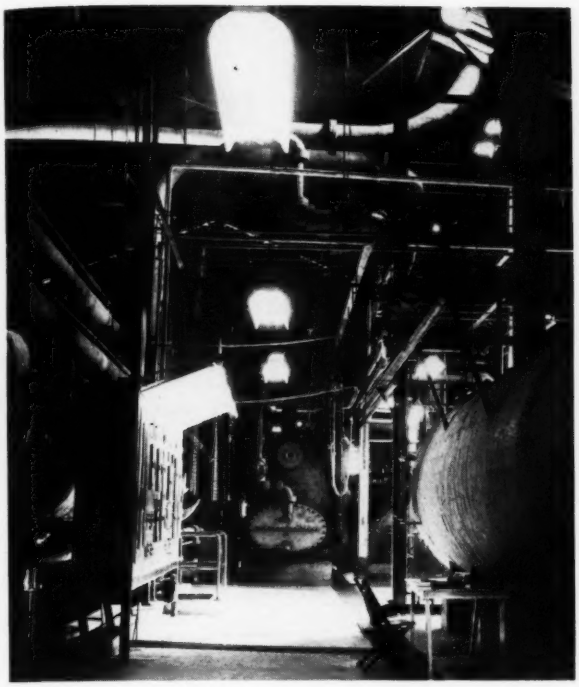
Items Included in Savings

This particular estimate of immediate annual savings included such items as: the reduction of the number of ties to be doweled, the elimination of losses during the long air-seasoning period, the elimination of interest on the investment in ties during air-seasoning and the reduction in fire insurance because of reduced stocks in the air-seasoning yard. Deductions included all additional costs involved in vapor-drying as well as depreciation and upkeep costs of the necessary vapor-drying equipment.

The vapor-drying cycle, as now established at the Spartanburg plant, comprises a drying period ranging from 12 to 14 hr. followed by a vacuum of 2 hr., and 4 hr. for treating and final vacuum. Thus, the total time for the process ranges from 18 to 20 hr., depending on the species of wood, the moisture content of the ties and the plant boiler pressure available.

Improved Research Facilities

Taylor-Colquitt research has not been restricted to vapor drying. In revamping the plant at Spartanburg the laboratory research facilities were expanded and improved so that several important experiments usually are in process at the same time. Of these, the most intriguing at present are being made with dimensional lumber, principally softwoods, and the application of vapor-drying to such material to reduce treating costs and speed up output. The primary object is the improvement of products and the conservation of forest resources through better and more thorough treatment, as well as the use of species that now have little or no commercial value because of certain detrimental characteristics. All present a broad field for continued research. Preventing the bleeding of knots in yellow pine following treatment, improving the depth of penetration and distribution of preservative in fir timbers, and overcoming the susceptibility to early decay of both black and sweet gum —these are examples of some of the studies now being made.



Above—One of five new American Diesel-electric locomotive cranes at work in pole yard of Taylor-Colquitt plant at Spartanburg, S. C. Left—The revamped plant is designed for carrying out both vapor drying and preservative treating of wood. The control panel in left foreground is "heart" of the plant

One project in particular that promises to have far-reaching effects in the wood-preserving industry is that of solvent recovery from wood treated with oil-borne preservatives. This process assures satisfactory paintability of wood treated with such preservatives as copper napthenate and pentachlorophenol, as well as effecting substantial savings in cost of treatment through recovery of solvent.

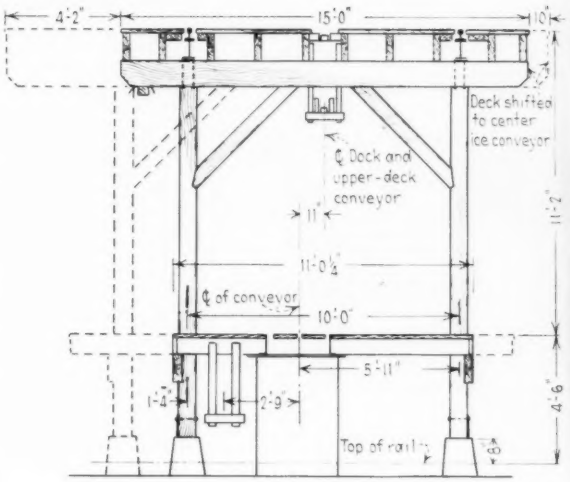
Although undertaken primarily for vapor-drying, the renovation of the Spartanburg plant now provides greater general treating efficiency. Not only does a new boiler plant provide an abundant supply of steam, but the rearrangement of all the treating equipment and the simplification of all piping has stepped up operating efficiency and reduced maintenance costs. Each of five treating cylinders now has its own working tank, condenser and pressure pump in addition to two filling pumps that serve all cylinders. This simplification of the arrangement now makes it possible for one operator and a helper to handle vapor-drying and treatment as well. With the exception of the control-instrument panels all of the electrical equipment has been isolated in a brick-and-tile building at the rear of the treating room for safety and cleanliness.

The Taylor-Colquitt Co.'s modern pole yard evidences probably a greater advance in the preparation, handling and manufacture of poles prior to treatment than almost any other phase of plant work. It was at the Spartanburg plant, for instance, that one of the first pole-peeling machines was developed. This type has been improved throughout the years, and the present equipment represents the latest development along these lines. Together with a slab gainer and a multiple drill the pole-peeling machines have stepped up production ten to one over the conventional methods that were in use 20 years ago.

N. & W. TRACK SHOWS IMPROVEMENT—Shown here is a stretch of track on the main line of the Norfolk & Western between Waverly, Va., and Disputanta, maintained under the direction of foreman Woodrow Pitts, whose section was judged as the best of all main-line sections in the road's annual track inspection. The inspection, which was made by a gyro track-recorder car and by maintenance of way officers, resulted in a system-wide, main-line rating of 9.75, as compared with last year's score of 9.67. The average for Mr. Pitts' section was 9.924 for two tracks.

An Icing P

Substantial savings in relocating a large timber ice dock were realized by cutting it into sections, shifting each section onto a special car, and switching the conveyance to the new location where section was unloaded onto new foundation.



Above—A section of the ice dock on the way to its new location. When skeletonized track was reached, the crane replaced switch engine as the motive power. Right—Cross section of double-deck part of the dock. Dotted lines represent portion of the original dock removed or set back in making it narrower

• The economic value of ingenuity on the part of maintenance men was emphasized on a recent job on the Chicago, Rock Island & Pacific, involving the relocation of a large timber icing platform in connection with the modernization of the road's yard facilities at Armourdale (Kansas City), Kan. In comparison with the costly procedure of completely dismantling and reassembling the structure, substantial savings were realized by moving it bodily, that is, by cutting it into sections and transporting them, in units of four 14-ft. panels at a time, on a specially-prepared flat car to the new location.

Situated in an east-west direction, the ice dock originally was located near the south side of Armourdale yard. It was a high level dock, 1,961 ft. long, and for 895 ft. of its length there was a lower deck for body icing. As part of the work of tranforming the yard into a hump classification yard, it was necessary to move the structure to the north side of the yard.

The dock consists of 141 panels, each approximately 14 ft. in length. The single-deck portion of the dock was constructed in 1923 of timber treated with Wolman salts, while the double-deck part, creosote-treated, was built in 1945. All the timber was in such good condition that, after the moving operation was completed, no parts required replacement except for a portion of the floor joists and deck lumber of the older portion.

Dock Narrowed Before Moved

Since the new icing facilities require less platform width than the old, the ice dock, before it was moved, was narrowed by setting in the posts along one side and cutting off part of the upper-deck overhang and all of the overhang of the lower deck. Details concerning the construction of the double-deck portion of the dock are shown in the accompanying cross section. The dotted lines represent the portion of the original dock which was removed or set back in making it narrower. The construction of the single-deck portion is essentially similar except for the absence of the lower platform.

Narrowing the platform by work all on one side created off-center positions for ice conveyors which originally extended along the center lines of both the upper and lower decks. This condition was corrected for the upper-deck conveyor only by shifting the deck as necessary on the supporting posts. The lower deck conveyor was allowed to remain in an off-center position.

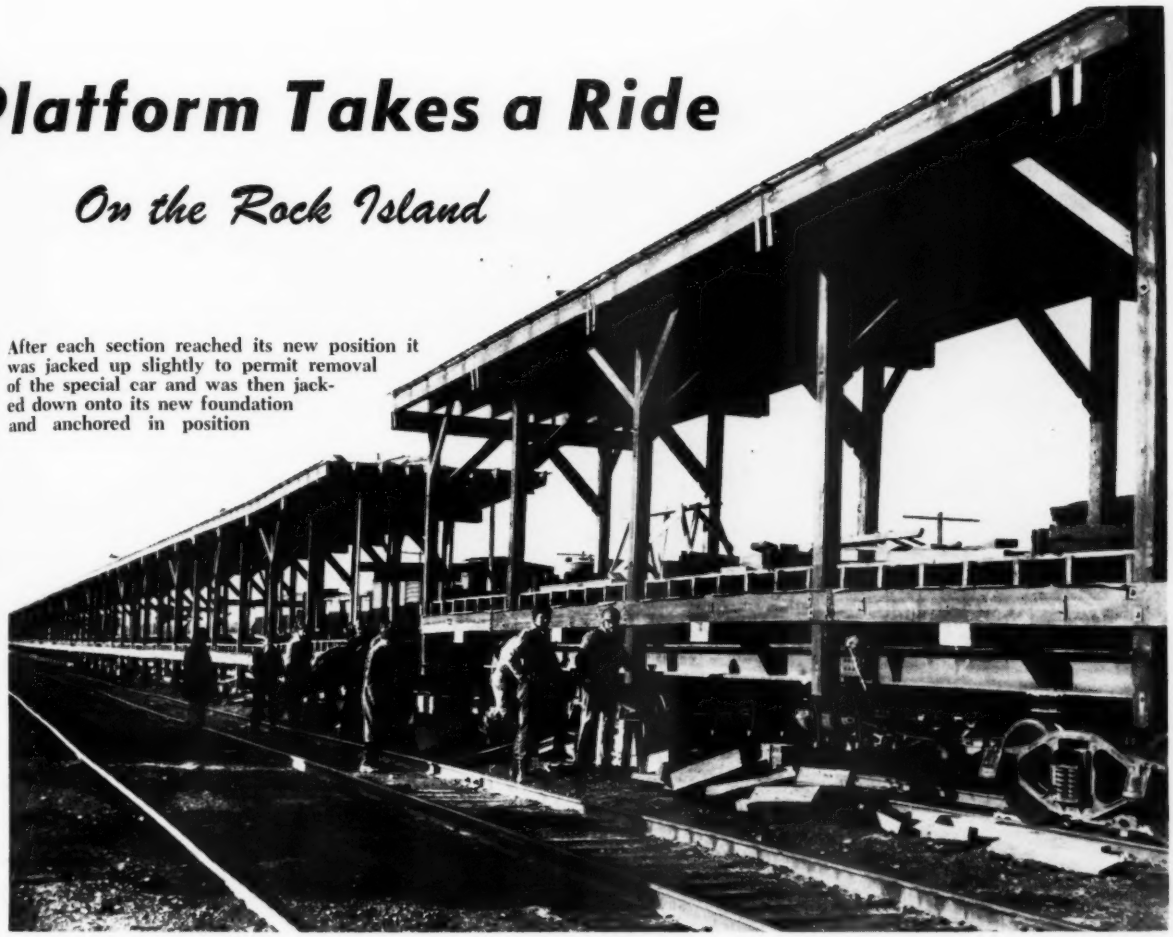
Narrowing the platform in this manner complicated the problem of providing a suitable conveyance, because it eliminated the possibility of using an ordinary flat car; conventional cars of this type were found to be too wide to go between the posts, and it was considered impractical to set the posts on top of a car. The problem was solved, however, by use of an old flat car which had been stripped to its skeleton in preparation for dismantling it. All that was left of it were the trucks, the bolsters and the center sill. By bolting longitudinally to the bolsters of this old frame two H-beams, one on each side, a car narrow enough to go between the posts was formed. These H-beams were 50 ft. long, considerably longer than the car. Consequently, to keep the coupler at one end clear for coupling to an engine, the beams were placed to overhang the car at the opposite end only.

Preparing the New Location

Preparation of the new location of the dock involved shifting an old track slightly to make its center line coincide closely with the proposed center line of the dock, and pouring the new concrete footings. To facil-

Platform Takes a Ride

On the Rock Island



After each section reached its new position it was jacked up slightly to permit removal of the special car and was then jacked down onto its new foundation and anchored in position

itate removal of the old track after the dock was moved into its new position, the track was skeletonized, and only sufficient ties and fastenings were left in place to carry the special car and a light locomotive crane for motive power.

The dock was moved in sections of four panels each. After each section was cut loose it was jacked up and shifted sideways over an adjacent track on roller runways, one near the posts of each panel. Each runway consisted of two 8-in. by 16-in. timbers, laid flat, one on top of the other, with lengths of 2-in. gas pipe between them to serve as rollers. The runways were supported on crib piers, one at each side of the dock and the other at the opposite side of the track. Support of the dock on the runways was provided, in the case of the double-deck sections, by the longitudinal stringers of the lower deck, and for the single-deck sections by longitudinal timbers bolted to the posts.

With the aid of bars for leverage, four men easily rolled each dock section along the runways. After the section was centered over the track, the car was run under it (the section having been jacked high enough, before it was shifted, to permit this), the lower timber of each runway was removed and the section jacked down until it was supported on the H-beams. The upper timbers of the runways acted as bearings between the dock and the H-beams. Then with a switch engine for motive power the car was switched to the new location of the dock, a light crane taking over as the motive power when the skeletonized part of the track was reached. As each section reached its new position it was jacked up slightly to permit removal of the car and was then jacked down onto its new foundation and anchored in position.

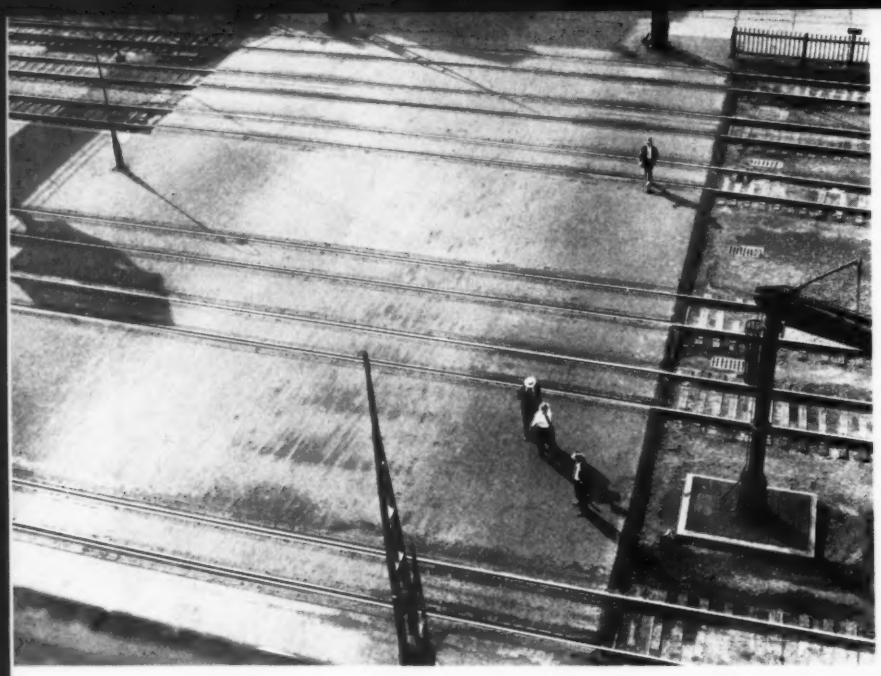
Moved Two Sections Each Day

In this manner two sections were moved each working day with a force of only eight to ten men. The moving operation was completed in about two months. After completion of this work the track was removed from beneath the platform and a central line of piers was poured to support the conveyor of the lower platform. In its new position the ice dock has been equipped with two Rico deck-type icing machines for placing bunker ice, which travel under their own power along a track on the upper deck. In its original location the lower deck of the dock was equipped with two 440-hp. ice slingers for body icing. These have been reinstalled on the platform in its new position.

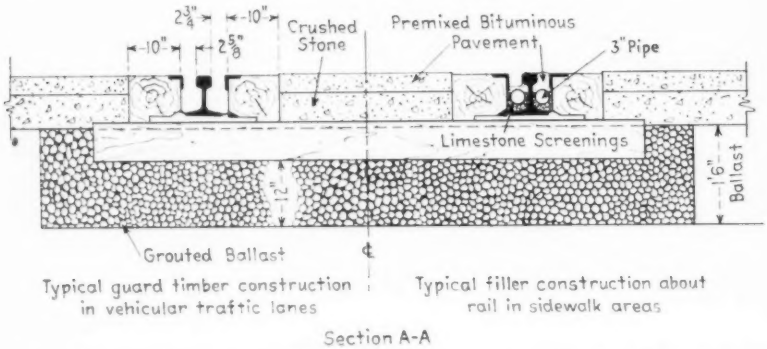
The dock moving operation was planned by T. J. Engle, engineer of buildings, H. H. Alfrey, chief scale inspector and supervisor of painting, F. W. Madison, division engineer (now assistant engineer of bridges at Chicago), P. E. Strate, supervisor of bridges and T. J. Webster, master carpenter, and was executed by the division forces of the Rock Island under the supervision of Mr. Madison and Mr. Webster.

N.&W. Adopts G

The plan for the new type crossing calls for grouting of the stone ballast section, and includes the use of preframed and prebored treated-timber flangeway guards, welded rail within the limits of the crossing, and bituminous pavement for the highway surface.

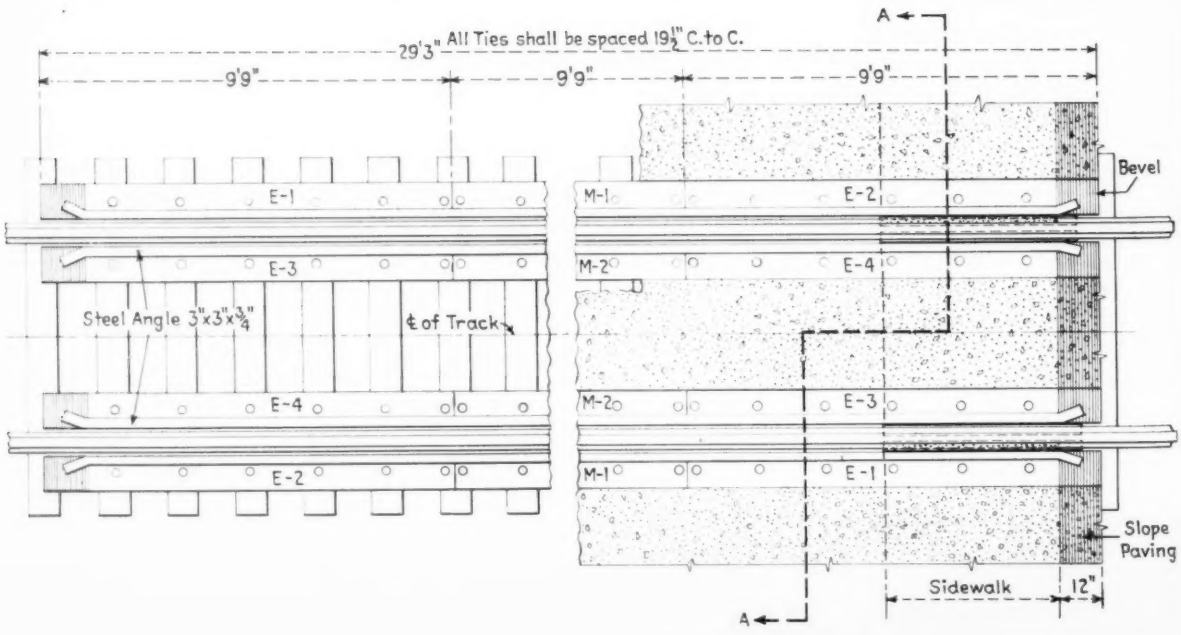


Above—The Jefferson street crossing at Roanoke, Va., is one of the largest crossings yet to be reconstructed according to the Norfolk & Western's new design



Above—Cross section showing different types of guard construction about the rails in traffic lanes and sidewalk areas. Below—Plan of a typical grouted crossing

Tamping guns are sometimes used to work the grout thoroughly into the ballast



Grouted Highway Crossings

• About three years ago the Norfolk & Western adopted a new design to be followed when rebuilding important highway grade crossings — a design that has a number of noteworthy features — and since that time has constructed 105 crossings to the new plan. The plan calls for complete reconstruction of the track structure on a grouted stone-ballasted base, using new ties, butt-welded 132-lb. rail, and 8-in. by 18-in. double-shoulder tie plates with special punching. Use is made also of treated-timber flangeway guards, framed and bored in advance, and attached to the ties in such manner that they permit the rail to be renewed without disturbing the highway pavement.

Installing Crossings

When rebuilding a crossing to this plan, the practice has been to install grouted ballast under the main tracks. However, the guard timbers are usually placed on all tracks through a crossing. Construction usually requires three days. On the first day, using a Burro crane, the old crossing is torn up and the old track, including the ballast, is removed to a depth of 18 in. below the tops of ties. New stone ballast, designated as "O" stone and ranging from ¾ in. to 3 in. in size, is then applied to a depth of 10 in. over an area extending five feet each side of the center line of track and six feet beyond the edge of the crossing on both sides of the highway. The new ties are then laid down on the ballast and are carefully spaced on 19½-in. centers. The tie plates and welded rail are then installed, following which ballast is added to within one inch of the tops of ties. The track is then placed in good line and surface, after which a temporary plank crossing is installed and both rail and highway traffic are restored.

On the second day the track is air-tamped and allowed to settle under traffic. The grouting operation is carried out on the third day. The grout mixture contains 1 part cement, 2 parts of brick sand and sufficient water to give it the consistency of thick cream, usually 8 to 10 gal. of water per sack of cement. High-early strength cement is preferred and the grout is delivered to the site in ready-mix trucks whenever possible.

The grout is poured over the ballast and is worked in with the aid of lining bars and, in some instances, tamping guns. This continues until the entire section is filled with grout to within ½ in. of the tops of the ties.

Timber Guards

The preframed guard timbers are then placed in position and fastened with ¾-in. Lewis Sealtite lag screws, 12 in. long. These timbers are prepared at the N. & W.'s timber treating plant at Radford, Va. They are 8 in. by 10 in. in section and are furnished in a total of six designs, designated E-1, E-2, E-3, E-4, M-1, and M-2, all being 9 ft. 9 in. in length. Those pieces designated "E" are used at the sides of the highway surface, and each is beveled downward at its outer end; those designated "M", have two square ends, and are used between the "E" pieces. The six designs are necessary to provide right-hand and left-hand guards for both rails of a track.

The minimum width of crossing, measured in line with the track, is 29 ft. 3 in. and is predicated on the use of two "E" timbers and one "M" timber on each side of each rail. Should a wider highway surface be involved, additional "M" timbers are added, as required, to increase the width of the crossing in multiples of 9 ft. 9 in.

The bottoms of the guard timbers are rabbetted so as to fit snugly over the tie plates, which, as already mentioned, are 8 in. by 18 in. in plan. The timbers are also rabbetted to receive a 3-in. by 3-in. by ⅜ in. steel angle along the top edge adjacent to the rail, to keep the wood fibers from breaking off under highway traffic. A flangeway, 2¾ in. wide, is provided on the gage side of each rail, and a 2⅝-in. opening is provided outside of the rails.

In addition to being rabbetted, the guard timbers are also bored to receive the lag screws, by means of which the timbers are attached to each tie. The holes are countersunk to receive the heads of the screws. Furthermore, holes are bored in the bottoms of the timbers to accommodate the heads of the anchor spikes holding the tie plates.

The tie plates used in the crossings, generally, are punched with a single additional hole to accommodate the lag screws holding the guard timbers in place. Joints between adjacent timbers fall at the mid-point of a tie. In such cases, two lag screws—one in each timber —are employed to fasten the timbers to a single tie and the tie plates for these ties are punched with two lag screw holes. The plates are punched at the M. of W. material yard at Roanoke, Va.

After the guard timbers have been secured in place with the Sealtite lag screws, the guard angles are attached to the timbers with ⅜-in. by 4-in. lag screws. Remaining work to complete the crossing is to fill between and on the outside of the timbers with stone, rolled or tamped to within three inches of the top of timbers, pave the entire area with three inches of bituminous material, and fill the countersunk holes around the heads of the guard-timber lag screws with mastic.

Where the crossing includes a sidewalk, suitable lengths of 3-in. pipe are inserted in the openings along each side of the rail in the sidewalk area. The space around and beneath the pipe is filled with limestone screenings, above which is placed a covering of bituminous material. A 2-in. deep flangeway is left on the gage side of the rail; on the outside, the bituminous mixture is made flush with the top of rail.

The first crossing to be built to this plan was completed more than three years ago. Since that time, no maintenance work, either on the tracks or the guard timbers, has been necessary. When it becomes necessary to change the rail, all that is required is to pull the rail-holding spikes and lift out the rail without disturbing the guard timbers or paving.

This crossing work is under the supervision of J. S. Felton, crossing engineer, Roanoke, Va., under the direction of A. B. Stone, chief engineer. Installation of the crossings is carried out under the direction of the various roadmasters on the system.

Auto Radio Saves S

Faced with an emergency, Chief Dispatcher A. H. Kambs radios details to . . .

. . . F. J. Corporon, superintendent, way & structures, out on the line. Mr. Corporon, in turn, contacts repair-truck crew, sends them to scene of trouble. Meanwhile . . .

• Space radio has brought to the way and structures department of the Chicago, South Shore & South Bend a means of "stopping trouble before it starts". Supervisor's cars, power-line and catenary-repair trucks, trains—in fact all mobile units on this railroad—are now at the dispatcher's finger tips—in all kinds of weather and at any time.

Within the way and structures department one line car (work train), two passenger autos—one for the assistant superintendent, way and structures, and the other for the track supervisor—and two signal department repair trucks have been equipped with Motorola two-way radios to keep them in constant communication with headquarters.

Even before the installation had been officially put in service, the desirability of including the supervisor of track in the hook-up was adequately demonstrated by a minor emergency, typical of the type that are petty in themselves but often cause traffic delays that add up during a day to poor operating results. Supervisor Bob Krueger, in his company-owned Studebaker coupe designated as Car 25, had left his office in Michigan City, Ind., on his way to South Bend, a 30-min. drive. He had only gone a short way when he heard over his radio the voice of the motorman on No. 16, a Chicago-bound passenger train, reporting an allegedly defective spring switch at the west end of Franklin Avenue siding in Michigan City. While he was turning his car around to go to investigate, the dispatcher started paging him.

"Calling Car 25, where are you Bob?"

"This is Bob in Car 25 near Shops," Supervisor Krueger replied, "I heard your conversation with No. 16 and am already on my way to Franklin avenue."

"Fine," said the dispatcher, "I have talked with the motorman of No. 13, due there in five minutes, and have told him not to proceed over the switch until it has been inspected."

"Okay, Mr. Kambs," said Krueger, "I'll call you back."

While this conversation was taking place, Car 25 had covered almost half the distance to the scene of the trouble, more than a mile from Shops. Arriving there, Bob threw the switch in both directions, inspected the points, rods and the spring mechanism—a Pettibone, Mulliken Mechanical Switchman. Finding the switch safe to use, he stepped to his car radio and reported that fact to the dispatcher. The conversation was also heard by the motorman of No. 13, which by this time was closely approaching. The dispatcher instantly authorized No. 13 to pass over the switch at scheduled speed and no delay occurred.

Supervisor Krueger has the radio in his car operating from morning until night, except when he has to leave it for prolonged periods. He claims it saves more of his time than any other device he has. Under the old system he might leave his headquarters and go to Hammond, Ind., expecting to work his way back by stopping to see each of his section gangs. On arriving at Hammond, he would call his office and might discover that he was needed back in Michigan City, or perhaps even at the other end of the line—South Bend. That often caused a great waste of time. With his radio, he can be called while he is en route and leave immediately for the site where he is needed. Mileage on his car is saved, his own time is saved, train delays are shortened, if not prevented, and the effectiveness of his supervision is increased.

At emergencies, such as washouts, broken rails, and run-through switches, Supervisor Krueger is able to okay the track for scheduled speed as soon as repairs have been made, instead, possibly, of having to walk a couple of miles to a telephone. The effectiveness of mobile radio units at emergencies of this sort has been enhanced by the inability, in the past, of the South Shore to use portable telephones because of the danger involved in their use in proximity to catenary and power lines. Permanent phone installations are located at stations and passing sidings, but that still leaves locations as far as 2½ mi. from the nearest telephone. With two-way communication via mobile radio units that distance is now at the minimum and efficiency is said to be at the maximum.

The greatest simplicity and flexibility are incorporated in the two-

Supervisor's Time

The installation of space radio on 77 mi. of the Chicago, South Shore & South Bend, an electrified railroad operating between Chicago and South Bend, Ind., is the first of its type to be authorized by the Federal Communications Commission. This article tells how a two-way radio installed in the track supervisor's automobile increases the effectiveness of his supervision, speeds his work, and increases the efficiency of his forces.

. . . Supervisor Bob Krueger, having listened to the conversation and learned location of the emergency, advises that he is already on his way there

The Motorola two-way radios are compact, easy to operate

way Motorola radios with which the South Shore's automobiles are equipped. The set is turned on by turning the volume control in a clockwise direction and is turned off by turning the volume control completely counter-clockwise. There are only two controls—the "squelch" or noise depresser, and the "volume" control. Since the frequencies on which the unit receives and transmits are constant, no tuning is necessary. Incoming voices are amplified and issue from a loudspeaker under the dashboard. To transmit, a military style microphone is picked off its hook on a small instrument case in the center of the "dash," and a button in the "mike" is pressed to close the transmitting circuit. No other adjustments are necessary.

To install the radios, the South Shore made only one major change in its automobiles. An oversize generator, capable of delivering sufficient current at idling speed to keep the battery charged, was installed in place of the car's usual generator. The transmitting and receiving units, each in its compact case, were located back of the seat in the baggage compartment of the coupe, and a single antenna was attached to the right-hand side of the rear bumper. Thus, with one complete installation costing about $800, the supervisor was given a tool that has greatly improved his effectiveness.

The two-way space radio relay system that provides such effectiveness on the South Shore is the first of its type to be authorized by the Federal Communications Commission. Its important feature consists of two remote radio repeater or relay stations, which are controlled entirely by radio and independent of land wire lines usually employed for such operation. These relay stations were required because direct communication from the dispatcher's office at Michigan City with trains and maintenance vehicles requires coverage beyond the limits of the horizon. However, with the general offices, including that of the dispatcher, located at about the midpoint of the 77-mi. electrified railway, only one relay station on each side of the dispatcher's transmitter was needed to provide complete coverage of the entire railroad.

At Michigan City two sets of fixed equipment are employed, one for direct contact with mobile units within the direct range of Michigan City, and the other for activating the two automatic repeater stations. Control facilities for both sets of fixed equipment are located in the dispatcher's office. The westward automatic repeater station is located at Shearson, Ind., and the eastward station is at Olive siding, a few miles east of New Carlisle, Ind. The Shearson relay station is about 30 mi. west of Michigan City and the Olive station is about 22 mi. east. Both are beyond line-of-sight distance from Michigan City.

Each of these relay stations has two antennas. Under one of these antennas a Bendix communication unit is used as a receiver and under the other a similar unit is used as a transmitter. The repeater stations receive signals from mobile units or the Michigan City fixed station on 158.43 megacycles and retransmit on 161.37 megacycles. All mobile units receive on this latter frequency.

The space radio system on the South Shore was planned and installed under the general supervision of W. J. Mallon, deceased superintendent of way and structures, with the help of F. J. Corporon, assistant superintendent of way and structures, recently promoted to succeed Mr. Mallon. Immediate supervision over the installation was had by F. A. Zerber, contract radio communication engineer, who is also in charge of its maintenance. The major items of radio equipment were furnished by the Bendix Radio Division of the Bendix Aviation Corporation, with the Mobile units in autos and trucks furnished by Motorola, Inc.

Chemical Weed Control Proves Successful

On the Boston & Maine

The Boston & Maine has, in the past 22 years, tried various measures for controlling the growth of weeds along its tracks. Following the intermittent use of chemicals beginning in 1930, the road undertook a definite annual program of chemical weed control in 1943, with the result that 1653 mi. of track were sprayed in 1949 at cost of less than $20 a mile.

• In common with many roads, the Boston & Maine has experienced considerable difficulty in controlling the growth of weeds along its tracks. Undesirable vegetation on the right of way has produced the usual evils of fouled ballast and clogged ditches and, on some branch lines, has been a source of discomfort and annoyance to trainmen. In addition its unsightly appearance has been considered particularly undesirable from the public relations viewpoint, as the B. & M. carries many vacationers during the summer season. Some of the weeds found in the territory served by this road include sour dock, Jimson weed, maiden cane, burdock, foxtail, briar, morning glory, shepherd's-purse, cocklebur, poison ivy, snakeroot, and witch grass.

Prior to 1928, hand methods were used to remove the weeds, those in the ballast section being pulled or scuffed with shovels. Hand mowing was resorted to where taller weeds, such as sweet clover, were encountered, as along the roadbed shoulder. Since that time the B. & M. has used various more advanced means of weed control, including chemicals. The use of chemicals was begun on a small scale in 1930 and continued on an intermittent basis until 1941. Beginning in 1943, the road began to use Herbicidol, a colloidal reversible type oil emulsion, produced by Reade Manufacturing Company, Jersey City, N. J. Encouraged by the success of that year's effort, it continued to use this product in each succeeding year in accordance with a definite and expanding program. Whereas only 711 mi. of main track were treated by this method in 1943, the program for 1950 includes 1670 mi. of main tracks and 463 mi. of yard tracks, and will require 80,000 gal. of concentrate.

The use of chemical weed killer on the B. & M. is largely a result of the fact that, because the states in which the road operates have large wooded areas, it had become increasingly difficult, due to the forest fire hazard, to obtain permits to burn weeds. This caused the road to curtail its weed-burning program.

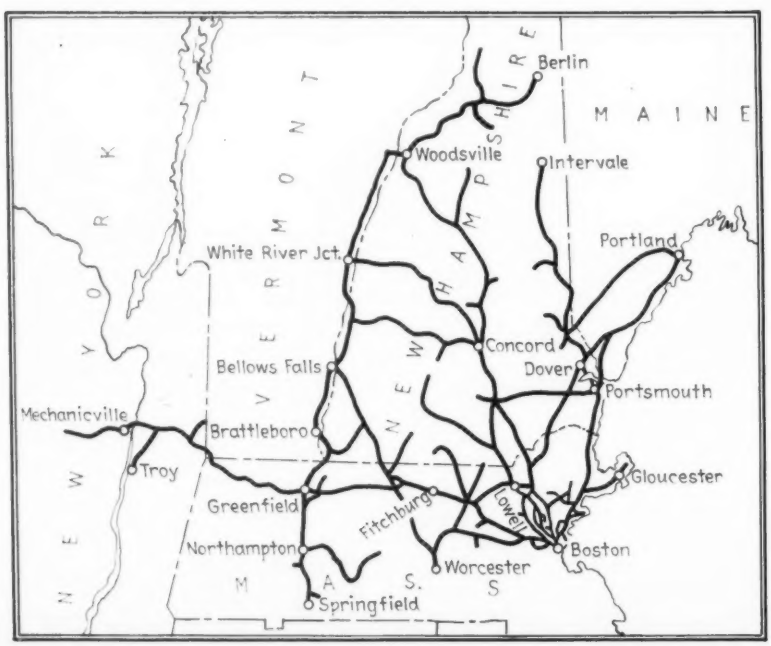
Chemicals were first used in 1930, when 5 mi. of track on the Portland division were treated. In 1931, 3½ mi. of track on this division were treated at a cost of $28.42 per mi. Thereafter, chemicals were used in 1934 and 1935, the cost for treating 255 mi. in the latter year being $25.82 per mi. Those costs, as well as the others given in this article, include all material, labor and work-train charges.

Between 1937 and 1940, the road made use of mechanical means of weed control, but it was

Weed-Control Statistics, Boston & Maine, 1943-49

Year	Miles Treated	Quantity of Concentrated Chemical Used (Gal.)	Amount of Diluted Mixture Applied per Mile (Gal.)	Cost per Mile*
1943	711	-----	-----	$18.24
1944	1,031	36,622	154	17.50
1945	1,472	54,399	148	14.09
1946	1,290	54,363	173	17.70
1947	1,745	57,210	132	15.91
1948	1,612	53,696	130	16.46
1949	(1,653	51,552	129	19.32
	(154 (yard)	4,448	140	38.64

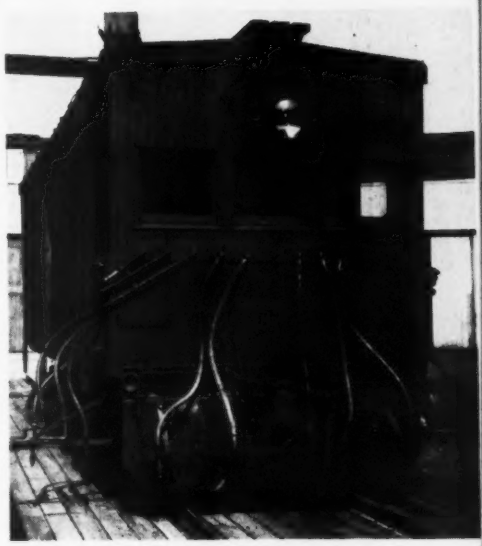
*Includes material, labor and work-train charges.



The Boston & Maine's weed killing program for this year includes 1670 mi. of main track

found that this method was not too effective on the types of growth encountered. Accordingly, the road turned to chemicals again in 1941, when it treated 658 mi. for $18.41 per mi.

In treating 711 mi. of track with Herbicidol in 1943 the cost was $18.24 per mile. The mileages treated in subsequent years, and the cost per mile for each year, are given in the accompanying table. It will be noted that the cost has varied somewhat during this period, as affected by wage and price increases. However, these increases have been offset, in part, by greater efficiency in applying the chemical; improved cooperation on the part of the operating department as regards the operation of the spray train; the lessening quantity of weeds, brought about because each year's spraying has the effect of killing the weeds before the seeds develop; and the increasing sterility of the roadbed resulting from the yearly application of the oil-base chemical weed killer. However, seeds blown in from adjacent areas, and the residual seed population in the soil, have combined to replace, in part, the destroyed seeds.



Above — A sightly appearance of the right of way has been considered particularly desirable from the public relations viewpoint, as the B. & M. streamliners carry many vacationers. Right— This company-owned car, converted from an old box car, is used for spraying roadbed with the weed-killing chemical

Method of Application

The B. & M. receives its supply of concentrated chemical at Boston and forwards it to specified locations along the line, where it is mixed in the spray train with water in the ratio of one part of concentrate to three parts of water. The spraying is done with a special company-owned spray car, converted from an old box car, containing a Diesel - powered pump, tanks, and the necessary pipes and connections. One end of the car is fitted with an operator's cab, and spraying is controlled from this point.

A total of 15 spray nozzles is mounted directly in front of the car. Five of these are on a fixed mounting and are arranged to spray within the limits of the ties. The remaining nozzles are on hinged mountings, on each side of the car, which may be folded back parallel with the car when not in use. Originally each of these hinged mountings had four nozzles, with the outer nozzles being set at such an angle as to cover the outer limits of the 25-ft. section of roadbed that the B. & M. desires to spray. In general, these limits include the outside ditch line in cuts and the edge of the roadbed shoulder on fills. Last year, nozzles were changed to the arrangement described above to obtain more efficient results.

Individual controls for the nozzles make it possible to confine spraying to the desired limits. When in operation on single-track territory, all nozzles are in use. Two passes are required in double-track territory. On the first pass, the track on which the spray train is operating, the outside shoulder of that track and the full inter-track space are covered. On the second pass, made on the second track, the spraying of the inter-track space is not necessary.

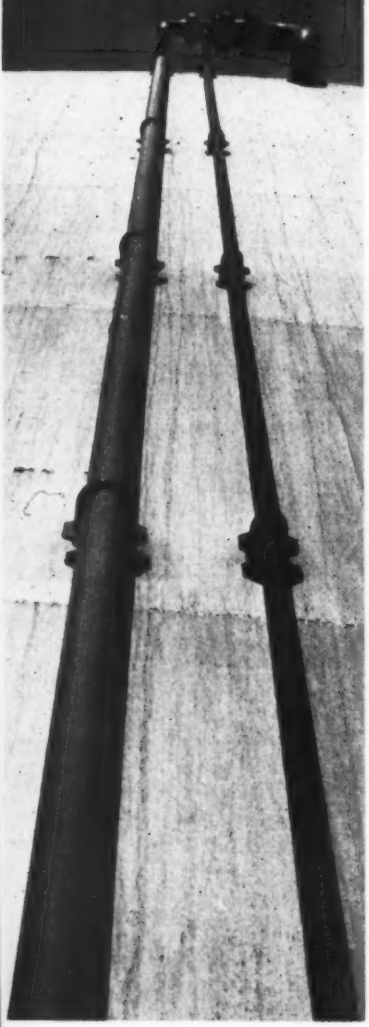
The results of this program have been considered highly satisfactory. Spraying is done in the latter part of June and in July, and, while all of the weed varieties encountered are not killed, many are, and the remainder are held in check for the balance of the growing season.

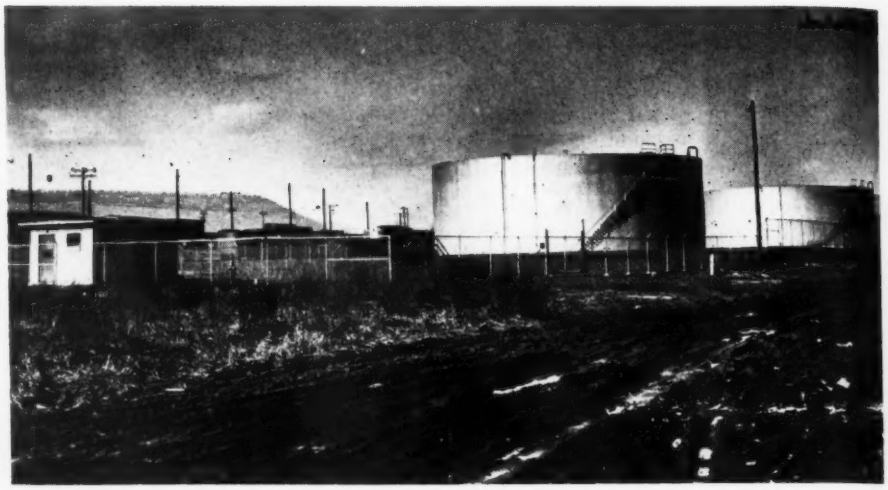
While the chemical used is toxic to cattle, it contains a repellent. The success of this repellent is indicated by the fact that the B. & M. has had no stock claims throughout the period since 1943.

Last year, the B. & M. used Herbicidol for the first time to control weeds in its larger yards, where many complaints had been made by trainmen. This work was done with an old weed burner which has been rendered useless by the states' refusal to grant permits for burning. This was converted to serve as a spray car. Only 154 mi. of track were treated and the cost was $38.64 per mi. This relatively high cost was largely due to the delays encountered when working in the busy yards. This year, two additional burners are being converted for yard use and the program, as mentioned, includes 463 mi. of yard trackage.

Weed control activities on the B. & M. are conducted under the general direction of S. G. Phillips, chief engineer, and H. F. Fifield, engineer maintenance of way, Boston, Mass. C. L. Fero, supervisor of work equipment, Boston, supervised the construction of the spray car described herein. Also, direct supervision of the spraying operations is Mr. Fero's responsibility.

Oil Tanks Protected by



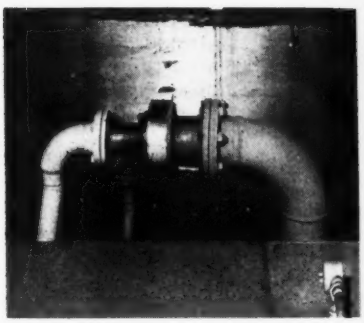


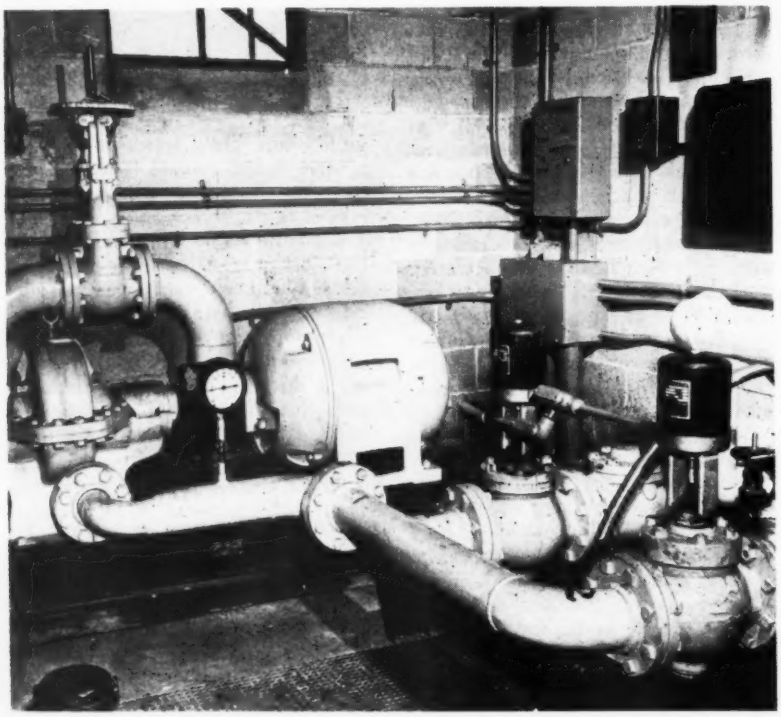
Above—The Lucknow storage facilities. Each of the two fuel oil tanks has a capacity of 2,000,000 gal.

Left—The larger pipe is the 2½-in. water line, and the smaller one is the 1¼-in. foam compound line

Right—Close-up of a thermoswitch and a foam maker. Switch operates when temperature reaches 212 deg. F.

Below—Interior of pumphouse showing booster pump at the left and motor-operated valves at the right

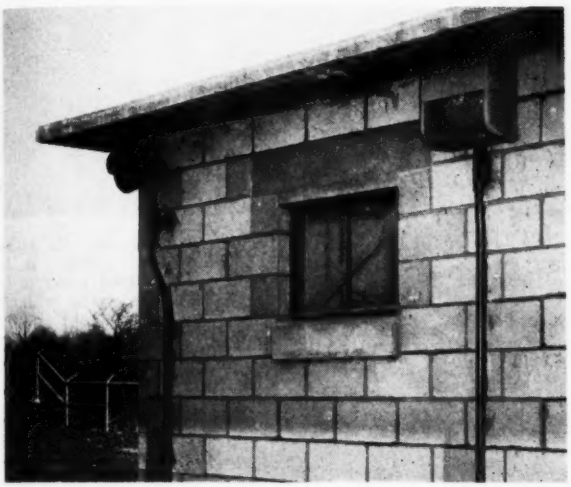




• Fuel-oil storage tanks on the Pennsylvania at Lucknow, Pa., near Harrisburg, are now protected by an air-foam fire-protection system which, if a fire breaks out, sounds an alarm, goes into action, extinguishes the blaze and then resets itself for future operation—all without being touched by human hand. Actuated by thermostatic switches, the system delivers 8,000-gal. of smothering foam a minute over the surface of the oil in either of two protected tanks. The automatic unit, furnished by the Pyrene Manufacturing Company, Newark, N. J., was the answer to a problem involving location, economy and the need for fast, certain protection against fire.

Harrisburg is the easterly terminal for passenger Diesels on the Pennsylvania, and Enola, just across the Susquehanna river, is

ed by Automatic Fire Department



Faced with the need for fast, certain protection against fire at Lucknow, Pa., where two 2,000,000 gal. Diesel fuel oil storage tanks have been erected in a location remote from any community and not readily accessible by road, the Pennsylvania adopted and placed in service a fully-automatic air-foam system that requires no human attention. Details concerning the installation and operation of this system are herein described.

The siren at left and gong at right both automatically sound an alarm if system is activated

the terminal for freight Diesels. The road recently completed large repair and servicing facilities at both points. Fuel oil is delivered to the Harrisburg servicing facility by rail, where five 67,000-gal. tanks are available for local storage. The main storage point, however, is Lucknow, about a mile to the west, where two 2,000,000-gal. tanks have been erected.

Tanks Not Readily Accessible

While the two tanks, each 36 ft. high and 100 ft. in diameter, adjoin the freight yards at Lucknow, they are remote from any community and are not readily accessible by road. Oil is pumped from Harrisburg to the Lucknow tanks for storage and is pumped back again when needed. Oil for use at Enola is pumped from the Lucknow storage tanks to Harrisburg where it is loaded in tank cars to be transported by rail to Enola.

No attendants are required at Lucknow to control the flow of oil to and from the tanks, as the pumps for this purpose are at Harrisburg. Even if it were possible to employ watchmen in the tank area on a 24-hr. schedule, this would not be economical, since these men would have no other duties.

These factors led to the adoption of the automatic foam system, the plans for which were prepared by the railroad in collaboration with Pyrene design engineers. Now completely installed and ready for an emergency, the system employs four thermostatic switches inside each of the tanks. These are set to function whenever the temperature in the tank reaches 212 deg. F. The pumphouse containing the foam-compound supply and the necessary pumps and connections is 200 ft. from the nearest tank and 500 ft. from the second tank.

The main water supply enters the pumphouse through a 6-in. line. Part of the water is taken off into a 2-in. pipe leading to a primary inductor. This device draws Pyrene foam compound from a 550-gal. tank through a 1¼-in. suction line. The compound, mixed with water, then moves under pressure through the 2-in. pipe which emerges from the pumphouse side by side with the main six-inch line. These lines lead to the base of each tank where the 6-in. water line branches into two 2½-in. lines, which extend to opposite sides of the tank.

Similarly, the foam compound line divides into two 1¼-in. pipes, which parallel the 2½-in. water line to opposite sides of the tank. The foam compound and water lines rise up the exterior surface of the tank to foam-makers on the inside lip. The foam-makers suck in air which is mixed with the water and the foam compound. The resulting foam is discharged through a curved pipe against the inside of the tank. Its initial force thus broken, the foam—from the two discharge pipes on opposite sides of each tank—spreads evenly over the oil surface in a smothering white blanket.

Foam Discharge Rate

When one of the "thermo-switches" is actuated by rising temperatures, a motor-operated valve is opened in the feed line leading from a pumphouse to the tank involved and an electrically-driven pump starts the water through the system—all automatically. Within a short time, foam is being discharged at the rate of 8,000 gal. per min. The system operates for 22 min., after which an automatic time shutoff switch functions to stop the pumps. This is sufficient time, it is said, to deliver an adequate quantity of foam to kill any fire which might occur. The quantity of foam discharged in 22 min. is 176,000 gal., sufficient to cover the oil in the tank to a uniform depth of 3 ft. When any one of the automatic switches operates the system, a siren is also sounded to inform railroad men that a fire has broken out in one of the fuel oil storage tanks.

Pennsylvania officers attended final acceptance tests conducted under simulated fire conditions. Operation of the automatic unit and the quality and volume of foam produced were considered highly satisfactory.

The significant variable in these specimens is that the one on the left was made with non-air-entraining cement while the one on the right was made with cement ground from the same clinker except that an air-entraining agent was added during grinding. A concrete mix was used in their construction which was too lean and too wet to produce durable concrete under severe exposure, yet which was representative of many mixes actually used in the field. The cement content was 4½ sacks per cu. yd. and the concrete had an 8-in. slump. It is evident that the specimen made with air-entrained concrete is showing much greater durabilty than the one made without entrained air. This good performance, however, should not be interpreted as an excuse for the use of air-entrainment to compensate for inferior materials or improper workmanship.

The box specimen on the left was made with concrete of 8-in. slump and the other with concrete of 1½-in. slump. The same cement was used in both specimens with the same aggregate and in the same proportions. In this case there was a short time interval between the casting of the two test specimens which may have had a slight effect on their relative performance. The importance of maintaining proper control of water for producing durable concrete is evident from the better appearance of the specimen on the right made with the low slump concrete. The minimum amount of water necessary for proper placeability of the fresh concrete is always more than is required for hydration of the cement. Water in excess of this minimum amount results in increased porosity and permeability, thus reducing durability of the concrete.

Test Specimens

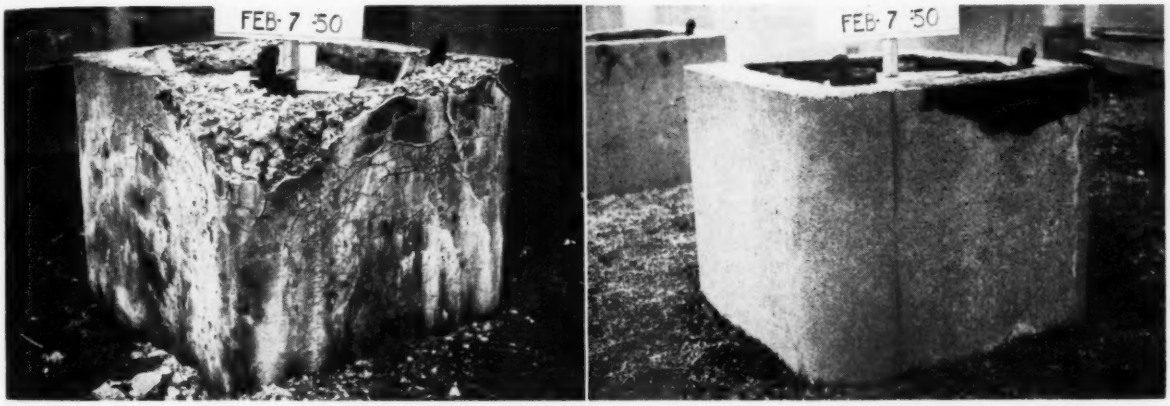
Show "Do's" and "Don'ts" Of Concrete Making

The Portland Cement Association is making a long-time study of cement and concrete performance in field specimens under exposure conditions which simulate those for retaining walls, abutments, etc. The performance of these specimens was discussed by Mr. Paris before the American Railway Engineering Association in March. Presented here is an abstract of his remarks.

By G. H. PARIS
Railway Representative, Structural Bureau, Portland Cement Association

• Let's consider for a moment the B.&B. foreman. How much is he worth to your railroad? During the thirty or forty years that he works for it he probably constructs several hundred thousand dollars worth of bridges, buildings and other structures. The quality of concrete going into those structures and the service received from them depends largely upon the forman's ability. Yet, how much time is invested in educating him in the fundamentals of quality concrete and its importance in the performance of these structures?

The effect of a rich versus a lean mix is demonstrated in these views, showing two boxes made with the same cement, aggregate and slump, but with concrete of different cement content. The specimen on the right was cast approximately two weeks earlier in the fall than the specimen on the left. The specimen on the left was made with 4½ sacks of cement per cu. yd. while the one on the right was made with 6 sacks per cu. yd. It is evident that there is no economy in skimping on cement and sacrificing on durability. These specimens, like the others shown on these pages, are boxes, 2 ft. 6 in. square, cast in place and filled with sand and water. This type of specimen represents such structures as retaining walls, bridge abutments and ballasted deck bridges, and many other railroad structures in direct contact with wet soil.



Consideration is seldom given to the effect of inadequate curing at proper temperature in cold weather construction on the durability of concrete to be exposed to severe weather conditions. Recommendations are available for cold weather construction which will produce good quality concrete. Too often such recommendations are disregarded, in part at least with a resulting depreciation in concrete performance. In these views, the box on the left was made in the late fall whereas the box on the right was made the following spring. Mix proportions, materials and slump were the same in both cases. The benefit of long curing and seasoning at favorable temperatures before freezing weather started is obvious. It is important in winter construction that the concrete be properly protected and adequately cured to insure durability.

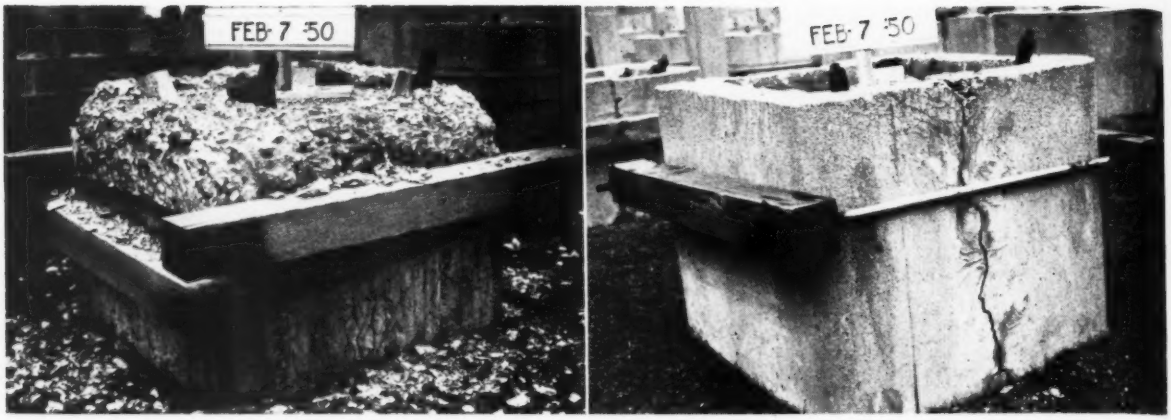
We must not only educate the men but we must furnish them with the necessary equipment for controlling the manufacture of the concrete in the field, and also furnish specifications that represent the best practices. The Masonry committee of the A.R.E.A. recognized the importance of educating the field forces in quality concrete construction and prepared the Guide to Water Cement Ratio Method of Making Concrete, written especially for them to assist in this important work.

Sometimes in our desire to economize in materials or save time on a project we overlook certain construction techniques or compromise on basic principles of making good concrete to the extent that we lower its quality. Yet when this structure is completed we expect it to perform just as well as the structure constructed according to the best concrete-making practices.

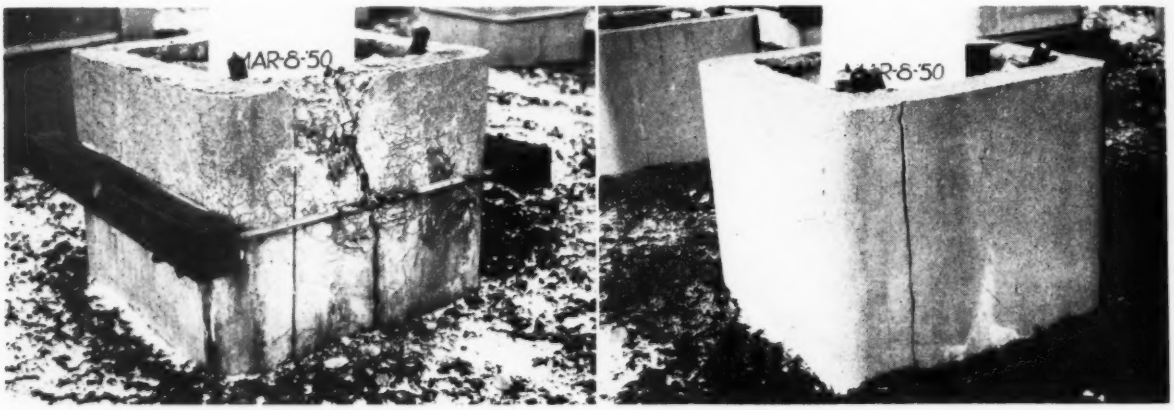
In 1940 the Portland Cement Association began a long-time study of the performance of cement and concrete with the cooperation of several state highway departments and other agencies. The investigation was motivated by the desire of both consumers and manufacturers of cement to improve the quality of concrete. The test program was laid out and its progress studied by an advisory committee composed of eight members outside the industry and four from it. The program includes test roads in three states, four pile installations, walkway slabs on a dam, parapet walls on another dam, sulphate exposure tests at Sacramento, Cal., and experimental farms in Illinois and Georgia.

Test Specimens

At the experimental farm in Illinois concrete control specimens are exposed to natural weathering. The project includes more than 1,000 specimens of three different types. One type of specimen is a slab 2 ft. 6 in. wide, 6 in. thick and 3 ft. 6 in. long, cast in place on the ground to simulate a concrete pavement. Another is a concrete box 2 ft. 6 in. square, cast in place and filled with sand and water.



Many factors enter the proper selection of aggregates for durable concrete. Performance records of aggregates should be examined, and adequate tests made before using a particular aggregate. To illustrate the effect of aggregate of doubtful quality on concrete performance, specimens were made using a sand which had a poor performance record. The specimen on the left contains this sand while the specimen on the right is made with an aggregate known to be of good quality. Cement content, slump and other conditions of test were the same except that the specimen on the right was cast about three weeks earlier in the fall than the one on the left. These specimens, along with the others shown on these pages, are part of a long-time study of the performance of cement and concrete being made by the Portland Cement Association.



Water gain and laitance accumulated during construction produce a weak porous concrete at the point of attack by weathering and is largely responsible for deterioration at the tops of wing walls and similar locations. Most difficulties of this nature can be eliminated by overfilling the forms and allowing the concrete to stand for about an hour before it is struck off. The specimens in the views above were identical except as to time of placing and method of finishing. The one on the left was cast early in the fall while the one on the right was cast early the next spring. The specimen on the left was finished immediately after the concrete was placed while the one on the right was finished as recommended above. The better performance of the specimen on the right is largely attributable to the method of finishing.

This type of specimen represents such structures as retaining walls, bridge abutments and ballasted deck bridges in direct contact with wet soil. The third type of specimen is an 8-in. square column, 5 ft. long, embedded 2 ft. in the ground. It represents structures such as bridge piers, foundations and walls partly exposed to weathering and partly buried in the ground. Six different mixes and two combinations of aggregate were used in the construction of the boxes and columns.

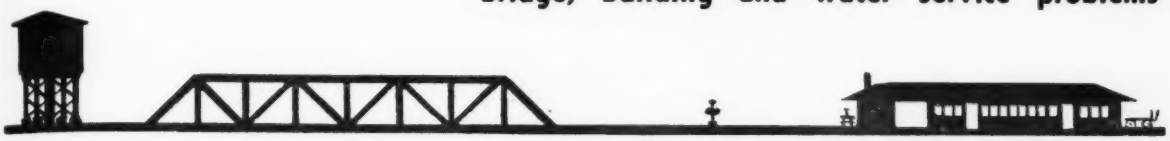
This long-time study enables engineers to examine concrete specimens under conditions of exposure comparable to the exposure of field structures, and to determine what properties of the concrete are responsible for the differences in their performance. Certain differences already are apparent in some of the box specimens. These demonstrate quite effectively the benefit of air-entrainment and, with certain reservations, the benefit of low slump versus high slump, rich mixes versus lean mixes, summer versus late fall construction, and good versus poor quality aggregate. There are also preliminary indications of the effects of certain construction techniques. All of these factors have a direct influence upon the durability of concrete in the field.

The accompanying photographs of some of the box specimens illustrate the effects on concrete performance of some of these factors—factors that are responsible for most of our poor concrete. All of these factors can be controlled in the field.

Box specimens for each of the six mixes and two aggregate combinations were made with 27 different cements representing all five ASTM types. This wide range of variables offers an excellent opportunity for studying their effects on the performance of concrete. Although this project is intended primarily as a comparison of cement performance, the effect of factors such as mix proportions, quality of aggregate and construction practices may be studied, provided proper consideration is given to the time of year in which the different specimens were cast.

WHAT'S THE ANSWER?

An open forum for maintenance men on track, bridge, building and water service problems



Assuring That Machines Clear Trains

How can operators of machines that must work or be set off alongside or between tracks be certain that their equipment will clear trains under all conditions? Explain.

Use AREA Clearance Diagrams

By J. W. RISK

Superintendent of Work Equipment Canadian National, Central Region, Toronto, Ont.

There are three defined areas in which machines may be set off or operated, each requiring precautions at variance with the others. The first area is that outside the limits of clearances indicated on a Clearance Diagram (Fig. 1) as recommended by the A.R.E.A. Clearance Committee and shown on page 28-2 of the Manual. Machines placed or working in this area will clear trains under all conditions.

The second area is that inside the limits of such clearance diagram and outside the limits of equipment clearances as indicated on the Equipment Clearance Diagram (Fig. 10) shown on page 28-10 of the Manual. However, this diagram is incomplete in that it does not provide for track curvature, super-elevation, tilt, throw, permissible wear, and truck-spring failure of equipment. These factors must be taken into consideration and special instructions issued in advance for the guidance of employees in the movement of wide loads as well as for personal safety.

The third area is that in which trains normally operate, and machines occupying this area are "an obstruction" and must be protected as prescribed by the Operating Rules.

Booms and other appendages to equipment working near tracks must be securely anchored to prevent their shifting into the third area, and the operators of machines must, by actual measurement of the clearance, determine that their equipment will clear.

Use a Clearance Templet

By J. E. CHUBB

Assistant Division Engineer, Pennsylvania, Columbus, Ohio

Of course, the safest and most practical thing, generally speaking, is to place equipment far enough from the tracks that there is no question as to its being in the clear, just as a workman clears for the passage of a train. However, for certain equipment which must be operated very close to the rails, it is not always practical or possible to move it for the passage of trains. To know that such equipment is not fouling the track at any time requires the use of a clearance templet.

This templet is a device which, when rested upon the tops of the rails with its "stop" against the near gage, has an arm that outlines the clearance line of maximum-dimension equipment (allowing a margin of safety). Every operator of a machine such as a ballast-cleaning mole, a flexible-

---

Answers to the following questions are solicited from readers. They should be addressed to the What's the Answer editor, *Railway Engineering and Maintenance*, 79 W. Monroe St., Chicago 3, and reach him at least 30 days in advance of the issue in which they are to appear. An honorarium will be given for each published answer on the basis of its substance and length. Answers will appear with or without the name and title of the author, as may be requested. The editor will also welcome any questions which you may wish to have discussed.

To Be Answered In the July Issue

1. When installing woven-wire right-of-way fencing over rolling terrain, how can the individual strands be tightened uniformly? Can similar methods be used to repair sagging fences? Explain.
2. What special care should be given paint brushes to secure the best possible service from them? Should the method of care be altered depending on the type or quality of the bristles?
3. What safety precautions should be observed in operating a locomotive crane on a superelevated curve? If necessary to swing an unloaded crane under such conditions should the boom or the counterweight be turned toward the low side of the curve?
4. How serious is the possibility of damage suits being brought against railroads because of altered waterway openings at bridges during or subsequent to maintenance or construction work? What precautions should be observed and records kept to protect the railroad against such suits? Explain.
5. Should track-raising work performed with on-track type tamping machines be done to grade stakes? Where should the stakes be driven? If stakes are not used, what other methods can be employed as a guide for the raising operation?
6. To what extent are meters required at Diesel fuel-oil storage and servicing points? At what points in the piping system should they be placed? Explain. What characteristics should such meters pocess to be satisfactory for railway service?
7. What does the term "modular design" mean in reference to building construction? To what extent is it adaptable to railway buildings? What are its advantages and disadvantages? Explain.

shaft grinder, or other equipment, the operation of which requires it to be close to the track, should have and use such a templet—for only then can there be no doubt in his mind that his equipment is in the clear and is not fouling the track.

The fact that the templet rests on the rail heads in the same manner as the rolling stock eliminates the effect of any super-elevation of the track. The margin of safety of the templet is sufficient to take care of the overhang of cars on curves.

Effect of Diesels on Rail Damage

What effect, if any, has the increased use of Diesel locomotives had on the incidence of rail damage and failures? Cite reasons therefore and experience in this regard.

Diesels Cause Fewer Breaks

By G. W. Bohannon
Chief Mechanical Officer, Chicago & North Western, Chicago

The C.&N.W. mechanical department is not prepared to furnish a statistical analysis, but we are aware of a reduction in reports of rail breakage attributed to locomotives, and that this reduction has coincided with our increase in ownership and operation of Diesel locomotives.

Our first Diesel locomotive was a 300-ton Ingersoll-Rand, placed in operation in 1926; the first Diesel passenger locomotive commenced operation on our line in 1937; and our first freight locomotives were received in 1945. At present, roughly 70 per cent of our switching and 30 per cent of our road service is performed with Diesel locomotives.

It is obvious that, by adding units, the tractive effort of a Diesel locomotive can be increased substantially over that of a steam locomotive, without increasing the load on individual drivers. In addition, the wheels of Diesels are practically in perfect balance and are less susceptible to out-of-roundness than the wheels of a steam locomotive.

Our operating department secures clearances from the engineering department before operating Diesels of different wheel arrangements, diameters and weights over specified districts.

Diesels Easier on Rail

By C. H. Sandberg
Assistant Bridge Engineer, Atchison, Topeka & Santa Fe, Chicago

It is generally agreed that Diesel locomotives are easier on rail and the track structure as a whole than is heavy steam power. However, there is one possible cause of rail damage from Diesel locomotives that, as yet, has not been definitely evaluated. This is the possible development of shear failures in the rail head due to high pressures caused by large loads on relatively small wheels. This shearing stress is a localized stress occurring a short distance under the running surface of the rail.

Shear failures in rail result from thousands and possibly millions of repeated applications of wheel loads giving high shearing stresses. The upper limit of shear stress that can be allowed without having to remove rail prematurely due to shear failures has not as yet been determined. The A.A.R., in conjunction with the University of Illinois, is working on this problem, having recently completed some rolling-load tests with 50-in. and 33-in. wheels. Owing to the inability to duplicate in the laboratory the loading conditions between wheel and rail that occur in the field, no reliable results have been determined, as yet, as to a maximum shear stress that should be allowed.

Recently the Santa Fe recorded wheel loads imposed on rail from both Diesel and steam locomotives as well as cars at various speeds. For Diesel locomotives the maximum wheel loads varied from about 33,000 lb. to 41,000 lb., with the maximum load being recorded at both 65 and 83 m.p.h.

For the 2-10-2, Santa Fe type steam locomotives, the maximum wheel loads varied from about 50,000 lb. to 64,000 lb. The maximum wheel load was recorded at a speed of 52 m.p.h. For the 2-8-4 Mountain type locomotives, the maximum wheel loads varied from 43,000 lb. to 62,500 lb., with the maximum load being recorded at 96 m.p.h. For car-wheel loads the maximum varied from 25,000 lb. to 35,000 lb. for freight cars and from 15,000 lb. to 29,000 lb. for passenger cars.

From the viewpoint of maintaining the line and surface of track under Diesels and heavy steam power, a comparison of roadbed pressures is of interest. Approximate computations using the above range of maximum wheel loads for both Diesel and steam power results in pressures of 800 lb. to 1100 lb. per sq. ft. under the ballast from Diesels, whereas the heavy steam locomotives gave pressures of 1200 lb. to 2000 lb. per sq. ft. Tests that have been made so far would indicate that there would be yielding or settlement when vertical roadbed pressures approach 2000 lb. per sq. ft. on plastic soils.

Temporary Trestles at Washouts

When floods wash out embankments to a depth and width sufficient to require a temporary trestle to restore train service, what short-cuts can be adopted in trestle design and erection to speed construction and minimize costs? Explain.

For Speed, Mechanize

By George S. Crites
Division Engineer (Retired), B. & O., Baltimore, Md..

Rapid erection of temporary trestles to restore service on washed-out lines calls for planning and mechanization of work rather than changes in trestle design. If the cost of having the line out of service is so small that the need for minimizing the expense of restoration is a great factor, probably the economical thing to do is to abandon the line.

Materials for the trestle will be secured from standard stock or elsewhere under standard specifications and, other than the driving of only three secure piles per bent, little can be done to effect savings.

If more than five or six bents are to be driven, a track for switching cars and equipment should be provided as close to the washout as it can be located. A power crane with a digging bucket should be first on the scene to excavate for the start of the trestle, and to handle materials. Piles should be placed as close to the washout as safety permits, and then caps, stringers, braces and ties strung out in turn to the rear.

The pile driver should be so equipped that it can furnish compressed air and electricity for operating tools and furnishing light. If the ground is suitable for operating a crawler crane, such crane is better than one on the rails for handling materials to the trestle site because it can work while cars and equipment are being switched.

If any improvisations in design are made, they should not include any reduction in the amount of bracing because, when under load, the temporary trestle would then lack the necessary stability even for temporary service.

Build to Minimum Standards

By J. L. STALEY

Bridge Engineer, Missouri-Kansas-Texas, St. Louis, Mo.

In most cases where fills become washed out to an extent requiring a temporary trestle to restore the line to traffic, there is not much that can be done to minimize costs. The general view is that even the quickest way to get the trains moving is too slow, and the cost of the method used is of less importance than the speed with which it can be accomplished.

Some practices will help to speed up the work, however, such as driving the minimum of piles in bents, using one less stringer per chord, or installing just enough ties to serve the purpose—each of these parts of the trestle to be strengthened later if the structure is to remain in service any length of time. No cutting or adzing need be done, except in cutting off the piles, and only a minimum of drifting and bolting.

The use of power driven saws and borers is a great time saver. This practice generally requires one or more air compressors or generators placed at the most advantageous spots. If night work is to be done, portable light plants are a necessity, if electricity cannot be secured from a near-by power line.

Adequate forces must be available and if more than one 12-hr. shift is to be used, the forces should be balanced for effective work. Often the placing of the best gangs for day work and using the less competent at nights will speed the completion of the job.

Organize Men and Materials

By E. S. BIRKENWALD

Engineer of Bridges, Western Lines, Southern, Cincinnati, Ohio

Essentially the two elements required to speed construction and to minimize the cost of a temporary trestle needed to bridge a washout are: (1) Flow of materials to the job; and (2) organization.

The flow of materials is increased by centrally located stockpiles of lumber and piling, and by central storehouses from which hardware can be obtained at a moment's notice. Watching monthly inventories to see that the supply at these points does not fall below minimum requirements will insure the availability of materials in emergencies.

This requires a standard design of trestle, the construction of which is familiar to division or district forces. In an emergency, a creosoted - timber, open - deck trestle is easier, cheaper and quicker to construct than any other type of structure. It is advantageous to use creosoted lumber and piling to permit stock piling in the first place, and, in the second place, to allow enough time, after the construction of the temporary trestle, to decide upon a permanent structure. Making this decision may require several years.

Proper organization of the forces and the work insures, without excess, the movement of adequate and sufficient materials to the job in the order of their need. It assures that equipment and tools are in good condition and are moved promptly to the job when needed. In a well-organized job bridge forces are moved to the washout efficiently, and there are not too many of them on the job. In such an organization each man knows what he is to do and does it.

Trestle designs are more or less the same except possibly for details. Sized caps, stringers and ties require less field labor and insure a better finished job. If piles are driven while the water is still high, much labor can be spent trying to cut piling under water without gaining time. The use of certain kinds of mechanical saws will speed pile cut-offs when they are above water. The use of double-panel stringers will provide fewer parts and will speed construction. Their use is also less hazardous to the workmen. Where piles cannot be driven, it is necessary to wait for the water to recede before applying blocking and starting to build the frame bents. At locations where the embankment is not high, it may be possible to build stone cribs, filling with material dumped from drop-bottom cars.

Each washout presents its own problems, and whoever is in charge of the work must be able to size up the situation and prescribe those methods that will assure the quickest restoration of train service.

Fire Prevention and the 40-Hour Week

How has the shorter work-week affected fire prevention methods and practices? In what ways are the bridge and building forces involved? Explain.

Investigate, Then Act

By E. P. GANGEWERE

Assistant General Manager, Reading, Philadelphia, Pa.

Last October I addressed the meeting of the Fire Protection and Insurance Section, A.A.R. on this same subject. The remarks I made were of a general nature in keeping with our meagre experience with the short work-week. Little has occurred since then to change their basic character. I said then that to correct the new fire-prevention problems that have arisen since September 1 when the shorter work-week went into effect, those problems would have to be analyzed from all angles. To do that, each trouble spot, whether it is a shop, engine-terminal, station, pier or wharf, would have to be carefully investigated to find its weakest link. Then, on that spot we should concentrate our major

efforts until its hazards have been eliminated.

One of the weak spots that has arisen since September 1 concerns the closing of stations, freight transfers, etc., over week-ends, involving from one to three days, depending upon whether holidays come on Mondays or not. We have found that to minimize the fire hazard during this hiatus, certain precautions are necessary. For instance, our station forces must be properly instructed in the care of heating systems and our maintenance-of-way forces must carefully check them periodically, to make sure all piping, floor protection, flues, etc., are in good condition. We must be sure our fire protection equipment is not going to freeze, and the best way to do that is to move it to spots that are continuously heated. We must be assured that our water supply is adequately protected with frost cocks against the winter temperatures. Our station agents, and those in charge of transfers, must be impressed with the need for making detail check-ups of the premises before leaving on Friday, perhaps not to return until Monday morning. And finally we must be sure that the relief men, if any, are as well instructed in fire prevention as the regular employees.

If we do all of these things, and more if specific investigation reveals the necessity, we will have no more fires during week-ends than we ever did.

Pumps for Handling Diesel Fuel Oil

What types of pumps are best adapted for handling Diesel fuel oil at storage and servicing points? What special characteristics are desirable in these pumps? What capacities? Explain.

Use Standard Layout

By Chief Engineer

Our original installations were centered about a 2-in., 80-gal. per min., rotary-type pump operated at a speed of approximately 400 r.p.m. through single reduction gears by a 7½-hp., totally enclosed, electric motor operating at a speed of approximately 1,800 r.p.m. This pump together with an equivalent strainer, air eliminator and meter was used at the beginning of our Diesel operations, both for unloading fuel into storage tanks from transport tanks and for fueling individual Diesel units. These installations proved satisfactory for small operations where single units were in use. These same original facilities are still in use, having been altered only by the addition of proper replaceable-cartridge filters, and by changing their locations to points at which the demand is not large and the element of time in fueling is not involved.

With the increase in our Dieselization and the bringing into use of three Diesel units combined, it was necessary to reduce the fueling time at principal points and increase the capacity. With these points in mind, and also the factor of an economic installation, we have centered our recent installations about the following equipment, which is now standard for most major points: (1) A standard 12-ft. by 15-ft. prefabricated, steel pumphouse with concrete foundations for both building and equipment; (2) a 4-in., 275-g.p.m., rotary-type pump operated at a speed of approximately 300 r.p.m. through double reduction gears by a 15-hp., totally enclosed, 440-volt, 60-cycle, 3-phase motor operating at a speed of approximately 1,800 r.p.m. (these motors are adapted for varying current characteristics as conditions required); (3) a 4-in. pipe strainer; (4) a 4-in. air eliminator with 100,000 cu. ft. daily capacity; (5) a 4-in. fuel meter with a capacity of 500 g.p.m.; and (6) a 4-in. replaceable-cartridge filter with a capacity of 300 g.p.m. Such major items of equipment have comprised our standard fuel-pumping station for the past several years.

This setup furnished fuel for one-spot fueling for a combination of three Diesel units. The oil is delivered through three fuel outlets, spaced on 50-ft. centers and reaches these through a 4-in. pipe line that is reduced near the fueling outlets to 2½ in. Other equipment includes ball-bearing swing joints, 2½-in. flexible hoses and 2½-in. nozzles and hose couplings to the individual Diesel units. The pump motor is operated by a magnetic switch, with push button start and stop, either at a point near the pumphouse or by remote control from a point near the fueling stations.

Through a suitable arrangement of valves this same pumping setup is used for transferring fuel from tank cars to storage tanks. We are well pleased with this standard layout because its capacity is large enough for most of our present needs, and it is economically practical from the standpoint of both first cost and operation.

Several Types Available

By A. B. Pierce

Engineer Water Supply, Southern, Washington, D. C.

There are several types of pumps that may be considered for handling Diesel fuel oil from tank cars to storage tanks, and from storage tanks to Diesel locomotives. Operating conditions at each Diesel fueling point determine, to a great extent, the type of pump to be selected. Horizontal motor-driven centrifugal pumps, deep-well type turbine pumps and rotory pumps give satisfactory service, depending on local operating conditions.

Where operating conditions do not involve a suction lift, **horizontal centrifugal pumps** with flooded suction may be used—this type of pump being also satisfactory with a suction lift if self-priming arrangements are embodied in the pump, and by-pass features are included. Centrifugal pumps directly connected to extended motor shafts make a good compact unit.

Where fuel oil is gravitated from tank cars to underground storage tanks, **deep-well type turbine pumps** are efficient when installed in the storage tank with each shaft extended outside of the tank to connect with a vertical type motor.

When oil is pumped from the domes of tank cars, a **rotary pump** is found satisfactory. This is a positive-displacement pump and can take care of suction lifts. This type of pump does not require self-priming features, and is constructed with a by-pass arrangement integral with the pump to prevent building up pressure when valves or nozzles are closed. Rotary

pumps are also manufactured and regularly furnished with reduction gears, and the rated capacity needed can be obtained at any desired speed. It is the thought of many users that, for handling fuel oil, slow-speed pumps are more desirable than high-speed centrifugal pumps of 1800 r.p.m. or more. This contention is somewhat questionable. A rotary pump tends to keep up its rated capacity while building up pressure when discharging through element-type filters. The characteristics of a centrifugal pump result in lowering its rated capacity when operating pressures are increased. All element-type filters gradually build up pumping pressures as they become dirty, and when the elements reach a point where they must be changed the pressure loss is about 30 lb.

As a general rule, at terminals where a large amount of oil is used, 300 to 400-g.p.m. pumps have proved satisfactory by demonstrating that their ratings are not too high to handle satisfactorily 2½-in. hose in servicing Diesels. At points where only switch engines are used, or a relatively small amount of oil is required, 100 or 200-g.p.m. pumps may be of sufficient capacity. Any type of pump should have special packing to take care of pumping oil, and specifications should state the type of oil to be used.

In figuring the capacity of the pump, and the required horsepower of the motor, frictional loss should be taken into consideration —not only for pumping through the pipe lines but through hose, element-type filters, meters, air releases and strainers on the suction line. If all of these frictional losses are not specified or taken into consideration, the rated capacity of the pump will not be obtained, particularly if a centrifugal pump is used. At important fueling points consideration should be given to the installation of duplicate pumping equipment, including electric starters, as failure of a single pump may cause delays.

Repairing Worn Stair Treads

What are the best methods of repairing wood, cement, or other types of stair treads that have become worn and hazardous? Explain.

Replace With Safety Treads

By J. W. Hayes
Architect, Great Northern, St. Paul, Minn.

Worn wood treads can be left in place and covered with standard-size cast-iron abrasive treads. Such abrasive treads should be furnished with proper-type nosings and beveled backs and with holes drilled in accordance with details of particular jobs. All holes should be countersunk for the application of wood screws. Abrasive treads can be procured from various manufacturers in steel, bronze and aluminum, as well as cast iron.

When concrete stair treads have broken nozings and badly chipped treads, a very satisfactory repair can be made by recessing the concrete treads a sufficint depth to permit the installation of standard-size, cast-iron abrasive treads. The cast-iron treads should be grouted in place and securely fastened to the concrete with expansion bolts of the right size. As in the case of wood stairs, the installation can be bronze, brass, aluminum or steel, as well as cast iron to suit the type of job.

Such safety treads can be procured in minimum thicknesses of ¼ in. to ⅜ in., but in all cases thicknesses should be installed adequate for safe-load requirements.

Use Mastic On Wood Treads

By J. J. Healy
Supervisor Bridges & Buildings, Boston & Maine, Boston, Mass.

Many of the office and locker buildings in railroad yards and shops contain interior wood stairways that are subject to hard continuous wear on treads. The problem of renewing such treads has often received the attention of maintenance officers. From this experience it has been found that mastic floor material is economical to apply and maintain, and provides a non-skid tread.

Before applying the mastic material it is necessary to cut the wood nosing flush with the face of the riser below. Then apply to the riser a ¼-in. by 2-in. steel strap by means of predrilled countersunk holes, allowing it to extend ½ in. to ¾ in. above the unworn surface of the stair tread. When this is installed, a chicken wire netting is loosely nailed to the stair tread to act as a binder for the surface material. The mastic is then applied to the wood tread to a depth of ½ in. to ¾ in. and finished to the top edge of the steel strap previously installed. There are a number of commercial mastic materials which may be opened to traffic 24 to 48 hr. after finishing.

Concrete stairways which require repairs due to heavy wear on the treads are usually restored to a safe condition by applying metal safety treads, cinch anchored or fastened with bolts leaded into the concrete. In this instance the old concrete should be bush-hammered to an approximate level grade, and steel treads set in a grout mixture to insure an even bearing.

Passenger-station stairways constructed of marble or terrazzo require frequent inspection for the protection of the traveling public. When necessary to replace this type of stair tread, it has been found that a precast, alundum-aggregate tread will improve the condition and will provide a non-skid surface that reduces the accident potential. White nosing and safety stepping-strips may also be cast into the tread.

Apply Mineral-Coated Fabric

By General Building Supervisor

To repair wood treads, sand them to remove grease and dirt, and fill any depressions in their surfaces with wood-paste filler to bring the treads to an even surface. Then apply over the top of each tread a sheet of hardboard ¼ in. thick, such as is obtainable under various trade names. This material is a composition board produced from wood pulp by a pressure - and - tempering process. The hardboard should be applied by means of a waterproof adhesive and, depending on the width of tread, should also be secured by means of from four to six brass wood screws with countersunk heads. For stairs protected from the weather, the hardboard can be secured in place by means of finishing nails if desired. Where hard-

board is used for new tread surfaces I recommend the application of mineral-coated fabric safety treads, which are obtainable in 6-in. by 24-in. sections, or in sheets. Such safety treads should be applied with waterproof adhesive.

Where metal treads and nosings have become smooth, their use can be satisfactorily continued by application of mineral-coated fabric safety treads in the same manner outlined above, except that they should be secured with waterproof adhesive only. For this purpose there is also on the market an abrasive coating which, having the consistency of paint, can be applied directly to the surface of all types of treads to produce a non-slip finish.

Cement or concrete treads whose surfaces are uneven, should be roughened to provide a depth of at least ¼ in. to receive a new special cement patch. A number of liquid admixes are on the market under various trade names for use with ordinary Portland cement, which, applied in accordance with the manufacturer's directions, will give a satisfactory patch job. The application of mineral-coated fabric safety treads over the surface of such treads will not only give additional safety, but will tend to insure the retention in place of the cement patches if a perfect bond is not obtained.

The effectiveness of such treatment is evident at a large bus terminal, when traffic is extremely heavy. Numerous claims for personal injury were being filed due to persons slipping on the stairways, the metal treads and nosings of which had worn smooth. Mineral-coated fabric safety treads were applied to these stair treads more than two years ago, and since that time claims for personal injuries on these stairways have been nil. At the present time some of the original safety treads are now being renewed, thus giving an indication of their service life under very heavy traffic.

Failures of Switch Throw Rods

What features of design can be incorporated, and other precautions taken to minimize failures of switch throw rods, particularly in the threaded portion? Explain.

Why Not Eliminate Threads

By George S. Crites
Division Engineer (Retired), Baltimore & Ohio, Baltimore, Md.

Renewals of switch throw, or connecting, rods are usually caused by the weakening of the rod at or near the clevis connection to the switch rod, due to brine drippings, or, more so, by the loosening and wear within turnbuckles, or socket screw joints, that are built into the rods for length-adjusting purposes.

Corrosion of the rod itself can be allayed by oiling or painting the entire rod with rust inhibitors. Frequent and careful applications should be applied to the switch end of the rod as that is where the corrosion will be the greatest.

Weaknesses in the turnbuckles, or screw sockets, can be overcome to a large extent by better design and careful manufacturing, but regardless of how they are made, such connections will be the weakest sections in the rods. The best and safest thing to do is to eliminate such threaded portions. Modern switch design calls for secure plates and braces and there should be no necessity for adjustments in the length of connecting rods.

A recent inspection of several hundred such rods on an important main line revealed that there was no positive evidence of a single rod having been adjusted for length since first installed some years ago. If the adjustment features are not used, why have them?

Inspection Is Tedious

By Track Supervisor

On our railroad we use an operating rod that is threaded on one end only and do not use a screw-eye connection to our switch-stand cranks. The threaded portion of the throw rod passes through the basket on the head switch rod. Malleable-iron sleeves screw on the operating rod on each side of the basket and are locked in place by jam nuts.

These rods have been known to fail within the threaded area covered by the sleeves or jam nuts. Such breaks have been described as progressive fatigue failures that can only be discovered before final rupture by a careful examination of the threads covered by the sleeves and nuts. Normal switch inspections will not uncover such defects.

Consequently we have made it a practice to remove all operating rods periodically and carefully examine all threads for possible cracks or other evidences of impending failure. This procedure is tedious and time-consuming, but has uncovered a few defective rods that might have caused wrecks had they not been discovered. So far it is the best method we have discovered to minimize throw-rod failures.

Should we be satisfied to continue spending inspection labor to ferret out such semi-hidden defects or should we look for other more economical means of doing the job? New developments in material-testing methods may be applicable to this inspection. I have often wondered, for instance, if the principles of magnetic-particle testing could not be applied to this problem—provided portable apparatus is available. Such a possibility surely warrants investigation.

Another question that I would like to see answered is: Can the new portable ultrasonic rail tester be adapted to searching for such defects? Since the breaks occur in these rods transverse to the axis of the rod, would not the ultrasonic principle be applicable, if the testing tips were held on the ends of the rods?

On the other hand, if operating rods could be designed to preclude our having to make any periodic inspection at all, I feel that would be the best solution to the problem. The character of the fatigue breaks leads me to believe that the threads themselves may be partially at fault. I am influenced to some extent in this feeling by a statement written by Dr. Charles Lipson, former head of the Stress Analysis Laboratory at Chrysler Corporation. In an article on threaded fastenings, he said, "The sharp corner root of a . . . thread represents a region of stress concentration. By rounding off the root of the thread an appreciable improvement in the resistance to shock loading can be realized."

THE WORLD'S *Finest* SPRING WASHER

No spring washer for track bolts should go flat before reaching a practicable and workable bolt tension. Ordinary washers do *not* meet this *fundamental* requirement. The VERONA *Fixed* TENSION TRIFLEX SPRING, in *addition* to furnishing this required free travel to reach adequate bolt tension, provides the *means* of applying *equal tension to all bolts.*

...and the* VERONA *Fixed* TENSION TRIFLEX SPRING *has the highest reactive pressure of any spring washer on the market.

VERONA *Fixed* TENSION TRIFLEX SPRING

WOODINGS VERONA TOOL WORKS

VERONA, PA. • CHICAGO, ILL.

We also make a complete line of alloy coil washers to A.R.E.A. 1948 requirements.

PRODUCTS OF MANUFACTURERS

New, improved equipment, materials, devices

(For additional information on any of the products described in these columns, use postcards, page 439)

NOLAN RERAILER

ANNOUNCEMENT of a new No. 5½ Nolan Rerailer for heavy duty service was made recently by the Nolan Company, Bowerston, Ohio.

A pair of Nolan No. 5½ rerailers in position for rerailing a Diesel locomotive

The No. 5½ Rerailer has a load capacity of 200 tons and is said to be particularly suitable for rerailing heavy Diesel, steam and electric engines. In fact, it was designed especially for these heavier locomotives. The special design and steel alloy material assure safe handling of heavy loads.

MACHINE PERFORMS STRING-LINE CALCULATIONS

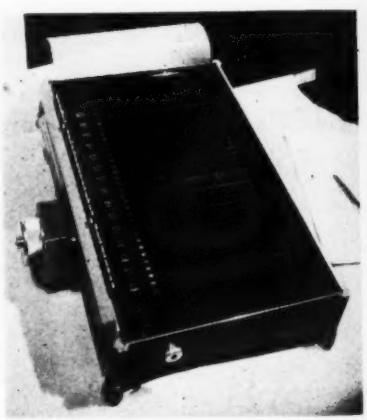
R. K. PRICE Associates, Inc., New York, is offering, through its American Railroad Curvelining division, a machine which performs all of the calculations incident to the lining of railway curves by the string-line method. This unit, known as the Curveliner, is reported to have a high degree of accuracy, because its mechanical construction automatically excludes the possibility of mathematical errors. Further, the machine is said to save considerable time in calculating a curve and to result in "throws" which, on the average, are considerably less in magnitude than those obtained with arithmetical solutions. The basic principles of this machine were developed by an engineer of the French National Railways, M. Bienfait, and a number of machines of his design are in use in 20 countries throughout the world. The Curveliner, described herein, embodies numerous improvements over the French machine, which render it more efficient in operation and more suitable for use in this country.

The Curveliner, shown in the accompanying photograph, is 16 in. wide, 20 in. long and 4½ in. high. The top surface is an etched panel of plate glass, graduated in units extending each way from a vertical zero line. Directly beneath the panel are 32 horizontal slots, representing as many stations on a curve, in each of which is a small triangular pointer. To the left of these slots are a series of small windows, containing station numbers and counters which indicate the throws at the various stations. Along the left side of the machine is a sliding gear box, while on the right is a hand-operated crank. Dials on the gear box provide a means of setting up a curve on the machine; for lining the curve; and for returning the machine to zero after completing the calculations.

With the machine set at zero, the pointers in the station slots may be moved, one at a time, to the ordinates as indicated by the curve notes, this being accomplished by moving the sliding gear box from station to station, and turning the operating crank to move the pointers. When this has been done the pointers will, in effect, form a graphical picture of the alinement of the curve.

The next step is to line the curve. To do this the dials on the gear box are set to the proper position, after which the various individual pointers may be moved to the right or left to smooth out the graphical representation of the curve as desired. The construction of the Curveliner is such that whenever a pointer is moved in one direction as a "throw", the two adjacent pointers move in the opposite direction at half the rate of speed, as an **effect** of the "throw." This is in accordance with the basic fundamental of string-lining. Thus, if a throw of +4 is made at a station, an effect of −2 will be noted at the two adjacent stations. This process is continued until the line of the pointers, and thus the alinement of the curve, is smoothed out to the extent desired by the operator.

The throws at each station can



The Curveliner performs mechanically all calculations involved in the string-lining of railway curves

be read from the indicators in the windows to the left of each station slot. The final step is to record these throws and to reset the machine to zero for lining the next curve or for lining the remainder of curves of more than 32 stations.

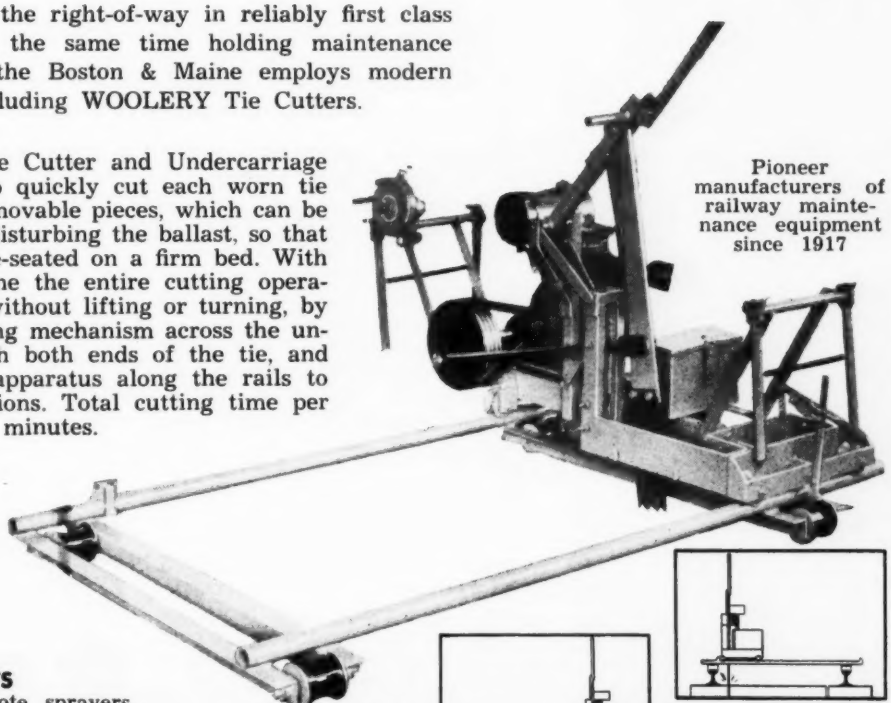
(Continued on page 478)

Hard-working trains need dependable track

To keep the right-of-way in reliably first class condition, at the same time holding maintenance costs down, the Boston & Maine employs modern machines, including WOOLERY Tie Cutters.

The WOOLERY Tie Cutter and Undercarriage enables one man to quickly cut each worn tie into three easily-removable pieces, which can be lifted out without disturbing the ballast, so that new ties may be re-seated on a firm bed. With this modern machine the entire cutting operation is performed without lifting or turning, by travelling the cutting mechanism across the undercarriage to reach both ends of the tie, and rolling the whole apparatus along the rails to successive tie positions. Total cutting time per tie is less than two minutes.

Pioneer manufacturers of railway maintenance equipment since 1917



Write now for brochure and complete information.

OTHER WOOLERY MAINTENANCE UNITS
Weed burners, creosote sprayers, motor cars, flangeway cleaners, tie plate spacers, rail joint oilers.

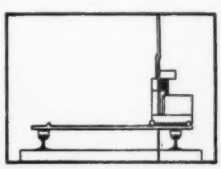


Figure 1—Making first cut at right end of tie, close inside rail.

Figure 2—With machine moved to left end of tie, making second cut.

WOOLERY MACHINE COMPANY
MINNEAPOLIS MINNESOTA
Pioneer Manufacturers of RAILWAY MAINTENANCE EQUIPMENT
RAILWAY WEED BURNERS • MOTOR CARS • FLANGEWAY CLEANERS • TIE CUTTERS • TIE PLATE SPACERS • RAIL JOINT OILERS • CREOSOTE SPRAYERS
EXCLUSIVE EXPORT REPRESENTATIVES: PRESSED STEEL CAR COMPANY, INC., NEW YORK, N. Y.

For additional information on any of the products described on this page, use postcards, page 439.

The Curveliner is capable of solving simple, compound or reverse curves and can be used to calculate spirals and easements, including the lengthening of spirals. Provision is made for locking the pointers of stations where physical conditions prevent throwing the track. These pointers will then move only as affected by throws at adjacent stations. A roll of tracing film may be inserted in the machine for use in making a chart of the original and final ordinates.

ALUMINUM TRACK JACK

THE Duff-Norton Manufacturing Company, Pittsburgh, Pa., has incorporated an aluminum housing in the design of its track jack and thereby reduced its weight by 18 lb. without sacrifice in durability. The new jack, known as the Model 117-A, has a bale-type handle for easy carrying and spotting, a thumb guard that protects workmen while setting pawls for tripping, and a 1⅝-in. square rack.

Other features of the jack include high-carbon, heat-treated alloy steel pawls, grease-packed and heat-treated bushings, and a hardened steel wearing plate to protect the housing. The jack has a capacity of 15 tons, an overall height of 22 in., a raise of 13 in. and weighs 42 lb.

The Duff-Norton Model 117-A aluminum track jack

A vapor steam generator in service powering a steam pile hammer

NEW USE FOR VAPOR STEAM GENERATOR

THE Vapor Heating Corporation, Chicago, has announced a new application for its Clarkson vapor steam generator which was developed primarily to supply large quantities of high pressure steam for heating Diesel-powered trains. With a few modifications, including addition of a steam chest, skid mounting and four eyes for lifting with a crane, it is said that this unit can be used effectively, and with low fuel consumption, for opration of steam pile hammers.

The generator, burning atomized Diesel oil, develops full working steam pressure in two minutes from a cold start, can be blown down in three minutes and left to stand in cold weather. Once started, automatic controls take over and turn the machine on and off, maintaining the pre-determined steam pressure. Water being pumped into the generator is continually turned into steam. Therefore, it is not necessary to shut down when feed water is added; sustained steam pressure is continuously delivered as needed. Vapor steam generators cannot blow up because there is no reservoir of water heated under pressure. Many safety devices have been incorporated in the unit to insure safe operation.

Power for the water pump, blower and spark may be supplied by electric motor, or gasoline or Diesel engine, making the unit completely portable for use at isolated points. The vapor steam generators are available in various sizes, developing from 360 to over 14,000 lb. of steam an hour at steam pressures of 75 to 600 p.s.i.

The smallest unit is 50 in. by 26 in. by 49 in. high, while the largest unit is about the size of an 8-ft. box. If the generator is used with crawler equipment, a tank mounted on a trailer is required to supply water.

ALCOA AUMINUM FOR BLAST PLATES

THE Aluminum Company of America, Pittsburgh, Pa., announces that its Alcoa aluminum alloy 61S-T6 is highly desirable for use as blast plates in the protection of exposed steel under bridges, and will give a service life of as much as 75 years. Such durability, it is pointed out, eliminates labor costs for maintenance and replacement. In addition, the aluminum sheets are said to weigh only one-quarter as much as conventional metal plates, thereby facilitating their handling and installation.

An end section of aluminum alloy blast plate being lowered for installation under a highway bridge near Toledo, Ohio

Why WASTE MONEY this way?

reduce tie seasoning from months to hours with

VAPOR-DRYING*

Stacked ties are idle dollars. They eat up interest, insurance, and valuable space—all avoidable costs, for Nature's leisurely seasoning by sun and air is no longer necessary.

Vapor-Drying* shortens the time "from trees to tracks" to hours instead of months. Eliminates decay "on the yard;" produces better ties, too. Preservatives penetrate better and deeper; checking and splitting are reduced; ties last longer. Complete sterilization makes it possible to use with safety those woods which have heretofore been serious risks because of susceptibility to early decay.

Get the story of Vapor-Drying; it's worth investigating. Another point, also. Besides seasoning ties, poles, and other timbers, Vapor-Drying is now being used for general purpose lumber.

TAYLOR-COLQUITT CO. T·C TIMBER CONSERVATION

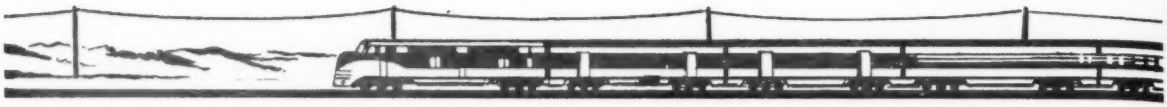
*Process Pat'd.

TAYLOR-COLQUITT CO.

SPARTANBURG, SOUTH CAROLINA

THE MONTH'S NEWS

Happenings among the railways — the associations — the suppliers



Changes in Railway Personnel

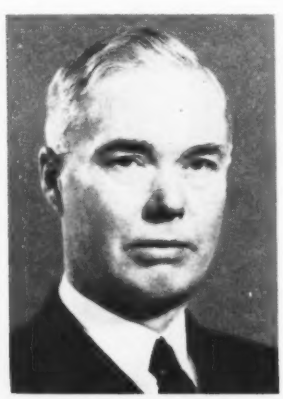
General

W. H. Kyle, general manager of the Central region of the Canadian National at Toronto, Ont., and an engineer by training and experience, has been promoted to assistant vice-president, operation, with headquarters at Montreal, Que.

W. C. Pinschmidt, engineering assistant to vice-president of the Chesapeake & Ohio at Cleveland, Ohio, has been transferred to Richmond, Va., as engineering assistant to vice-president—construction and maintenance, of the Chesapeake and Pere Marquette districts.

Engineering

Walter G. Dyer, whose promotion to assistant engineer maintenance of way of the Prairie and Pacific regions of the Canadian Pacific, with headquarters at Winnipeg, Man., was announced in the March issue, was born at Indian Head, Sask., on July 19, 1899. He received his Bachelor of Science degree in civil engineering from the University of Saskatoon in 1925, and entered railroad service with the C. P. R., serving as a rodman during the summers of 1923 and 1924. On May 11, 1925, he was appointed building inspector and subsequently served in various capacities in the engineering department until April 29, 1940, at which time he was advanced to roadmaster at Lanigan, Sask. A year later he was appointed resident engineer on the Moose Jaw division, being advanced to division engineer on July 1, 1941, with headquarters at Moose Jaw, Sask. Mr. Dyer was transferred to Pentican, B. C., on April 9, 1943, and on January 1, 1946, he was appointed engineer of track at Montreal. On March 1, 1948, he was advanced to district engineer, serving in that capacity until his recent promotion.



Walter G. Dyer

H. E. Balfour, assistant engineer on the Canadian National at Montreal, Que., retired recently after 29 years' service.

H. L. Keffer, resident engineer on the Chesapeake & Ohio, has been appointed assistant cost engineer at Columbus, Ohio.

G. L. Roberts, transitman on the Canadian Pacific, has been appointed assistant engineer on the Toronto Terminals Railway, with headquarters at Toronto, Ont.

M. P. Oviatt, bridge and building supervisor on the Southern at Lexington, Ky., has been promoted to division engineer of the Mobile division at Selma, Ala.

C. K. Lucas, office engineer of the Clinchfield at Erwin, Tenn., has been promoted to assistant chief engineer. The position of office engineer has been abolished.

W. S. Ray, assistant engineer of bridges and buildings on the Central of Georgia, has been promoted to engineer of bridges, with headquarters as before at Savannah, Ga.

John F. Salmon, special duty engineer on the Central region of the Canadian National at Toronto, Ont., who was bridge engineer of that region until recently, has retired. He had 37 years' service with the Canadian National.

B. J. Ornburn, whose appointment as assistant chief engineer—structures, of the Chicago, Milwaukee, St. Paul & Pacific, with headquarters at Chicago, was reported in the April issue, was born at Granville, Mo., on July 21, 1900, and received his higher technical training at the University of Missouri.

B. J. Ornburn

He entered railroad service in June, 1922, as a rodman on the Wabash at Moberly, Mo., and in 1923 he became a detailer and checker of designs and plans for the Missouri State Highway Commission at Jefferson City, Mo. He became employed by the Marland Refining Company in 1926 as a structural engineeer at Ponca City, Okla., and in 1927 he was appointed structural engineer in charge of the drafting room of Harrington-Howard & Ash, consulting engineers, Kansas City, Mo. In 1929 he joined the Montana State Highway Department as design engineer, and became bridge engineer in 1931, and bridge design engineer in 1935. He was appointed assistant engineer of the Northern Pacific at Seattle, Wash., in April, 1942. Mr. Ornburn was advanced to assistant bridge engineer a year later, and in August, 1946, he entered the service of the Milwaukee as assistant bridge engineer. He became engineer and superintendent bridges and buildings—system in June, 1947.

E. E. Burch, whose promotion to bridge engineer of the Chicago, Milwaukee, St. Paul & Pacific, at Chicago, was reported in the April issue, started his engineering career with the Universal Portland Cement Company. Mr. Burch entered railroad service in 1923 in the Illinois Central's building department, and in 1928 went with Graham, Anderson, Probst & White, architects, as a designer. Subsequently he was associated with Nimmons, Carr & Wright, architects, as a designer on flat slab buildings, joining the Milwaukee in Septem-

(Continued on page 482)

"We have always felt that the old poisonous type weed killer is the best, but we could not use it because of livestock losses. We now find your 'HERBICIDOL' does the same work and we have no livestock claims."

That brief statement tells a big story. A story of groping for twenty-five years with this problem: How can we give the railroads the best kill using a powerful poisonous weed killer, and still not involve in its use any risk to livestock? Day and night, fifty-two weeks in each year, year after year, we worked tirelessly to find the answer to this problem. A mass of data bearing on the subject was accumulated by our chemists working in laboratory and practical field tests.

Strange to say, the answer came in war time. Again necessity was the mother of invention. What started out as a substitute weed killer proved to be a product of permanent value to railroads. Today this product is standard on a long list of railroads.

We make a wide assortment of different types of weed killer. We have the skill to duplicate any product if it has merit. So the product we want to sell to you is the one best suited to your conditions. There are no strings on our choice or recommendations.

Many railroads find "HERBICIDOL" the answer to their weed control program—a low cost product, one with no element of risk to stock—one that does not easily leech out of the ground as water-soluble products do.

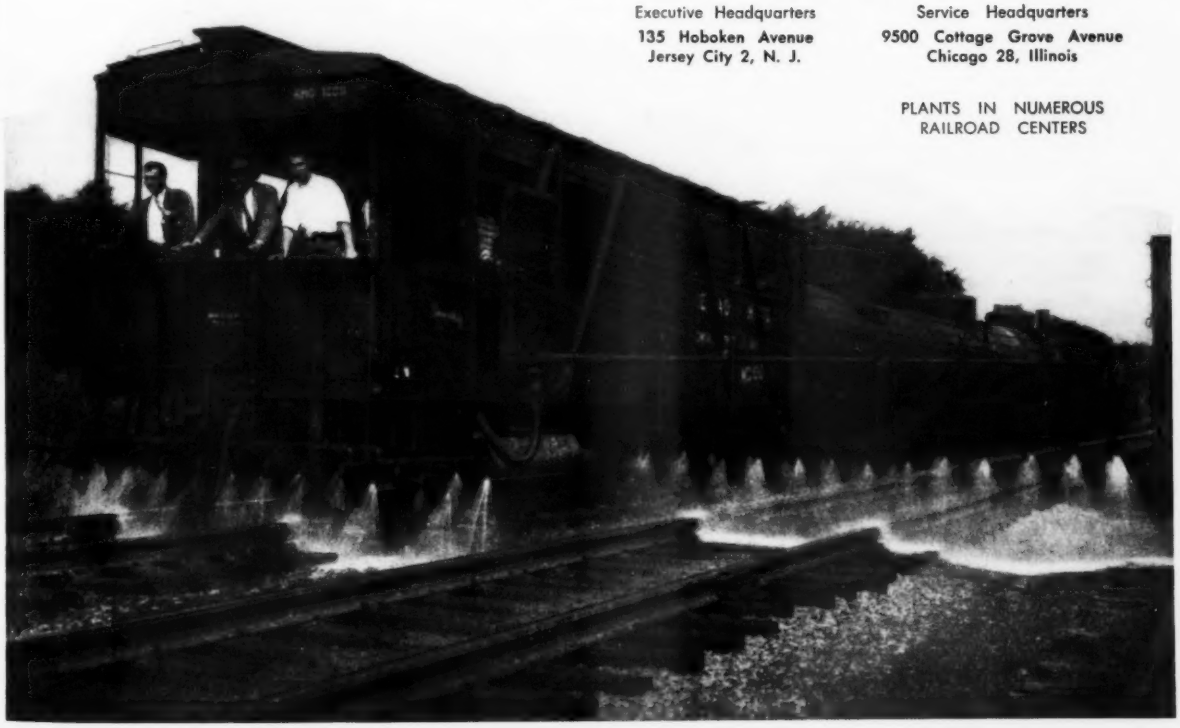
If "HERBICIDOL" is not the product that you have need for, we will recommend the one that you should be using.

READE MANUFACTURING COMPANY, INC.

Executive Headquarters
135 Hoboken Avenue
Jersey City 2, N. J.

Service Headquarters
9500 Cottage Grove Avenue
Chicago 28, Illinois

PLANTS IN NUMEROUS RAILROAD CENTERS



Railway Personnel (Cont'd)

ber, 1929, as a designer on grade separation work. Two years later he left the Milwaukee to establish his own practice at Denver, Colo., as a consulting engineer for mine structures. On returning to Chicago in 1937, he became associated with Keller & Harrington, consulting engineers, in design and detail of movable bridges. In September, 1938, Mr. Burch returned to the Milwaukee in the bridge department as a designer. He was appointed assistant bridge engineer, with supervision of all structural design, in June, 1947, and held that post prior to his promotion.

E. E. Burch

W. E. Laird, division engineer of the Little Rock and Louisiana divisions, Missouri Pacific, has been transferred to the St. Louis Terminal and Illinois divisions at St. Louis, Mo. He succeeds **W. W. Salisbury,** transferred to the Eastern and Kansas City Terminal divisions. Transferred to succeed Mr. Laird is **W. Rambo,** division engineer of the Central Kansas and Colorado divisions, who had been replaced in turn by **G. L. Bown,** division engineer at Kansas City, Mo.

Lee W. Howard, divison engineer on the Illinois Central, with headquarters at Jackson, Tenn., has been promoted to the new position of assistant valuation engineer at Chicago. He is succeeded by **Norman W. Kopp,** engineer of design at Chicago. **John E. Rogan,** supervisor of track, with headquarters at Corinth, Miss., has been promoted to division engineer, with headquarters at Jackson, Miss., succeeding **Frank T. Kraft,** who has been transferred to Clinton, Ia. Mr. Kraft replaces **Leo E. Donovan,** who has been transferred to Paducah, Ky., succeeding **C. J. Carney,** whose death is announced elsewhere in this issue.

Mr. Howard, who is a 1935 engineering graduate of the University of Wisconsin, joined the Illinois Central in 1937 as a chainman on the Memphis division. Since then he has served as chainman on the Springfield division, rodman and assistant track supervisor on the Vicksburg division, and assistant track supervisor on the Louisiana divison, Mr. Howard served with the army during World War II and was discharged in 1945 with the rank of major.

Mr. Kopp is a native of Buffalo Center, Iowa, and was graduated from the University of Iowa in 1939. He joined the Illinois Central in 1940 as a chainman on the Memphis divsion. In the same year he became a rodman on the Mississippi division, being promoted to assistant supervisor of track in 1942, and to supervisor of track in 1944. Mr. Kopp was appointed assistant engineer in the bridge department at Chicago in January 1946, and in December of the same year was transferred to the office of the vice-president and chief engineer, retaining the title of assistant engineer. He became engineer of design in August, 1949.

Mr. Rogan was graduated from Tulane University in 1932 and joined the Illinois Central in 1936. From 1936 to 1942 he served as chainman, rodman and instrumentman, working on the Vicksburg, Louisiana and Memphis divisions. In March, 1942, he was promoted to assistant supervisor of track on the Louisiana division, and in November of the same year he was transferred to the Gulf and Ship Island Lines as acting supervisor, with headquarters at Mendenhall, Miss. He was promoted to supervisor of track in that location in February, 1943. He served as supervisor of track on the Louisiana division from April, 1946, to June, 1942, when he was transferred to the Mississippi division, with headquarters at Corinth, Miss.

John G. Fry, whose promotion to division engineer on the Gulf, Colorado & Santa Fe, with headquarters at Temple, Tex., was announced in the April issue, was born at Kansas City Mo., on October 18, 1913. He was graduated from Notre Dame University in 1935 and entered the service of the Atchison, Topeka & Santa Fe in October, 1936 as a chainman at Newton, Kan. Subsequently he served as rodman and transitman, at Newton, and in March, 1943, he was appointed transportation inspector at Chanute, Kan. In December, 1945 he was transferred to Arkansas City, Kan., and in January, 1947 he was appointed acting division engineer at the same location. In the same year he reassumed his position as transportation inspector at Arkansas City, serving in this position until June, 1949, when he was promoted to roadmaster, with the same headquarters. He served in this position until his recent promotion.

Cecil A. Colpitts, whose promoton to district engineer of the British Columbia district of the Canadian Pacific at Vancouver, B. C., was announced in the March issue, was born at Winnipeg, Man., on January 23, 1907. He attended the University of Manitoba, graduating in civil engineering in 1933. He first entered the service of the Canadian Pacific on July 13, 1925, as office boy in the Weston shops at Winnipeg and thereafter served intermittently in construction until he completed his education. He was appointed transitman at Edmonton, Alta., in 1934 and served in that capacity at Calgary, Alta., and Winnipeg until 1941, when he was appointed roadmaster at Lloydminster, Sask. The following year Mr. Colpitts was promoted to division engineer at Saskatoon, and on July 1, 1944, he was transferred to Vancouver. He was advanced to assistant district engineer of the British Columbia district on April 17, 1949, and held that position until his recent promotion.

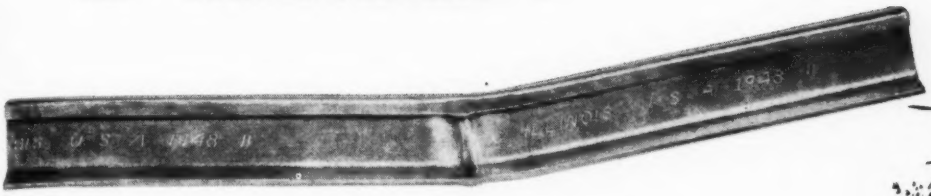
Cecil A. Colpitts

Thornton M. Mouring, whose promotion to assistant to chief engineer of the Maryland & Pennsylvania at Baltimore, Md., was announced in the February issue, was born in Baltimore on November 28, 1919, and entered the service of the M. & P. as clerk—office boy on March 1, 1938. Thereafter he served as clerk in the general and local freight offices and in the engineering and accounting departments until December 1, 1942, when he became a bookkeeper in the accounting deparment. After a period of military service in the Pacific theatre, during which he attained the rank of first lieutenant of engineers, Mr. Mouring returned to the M. & P. as bookkeeper. In April, 1947, he entered the engineering department as engineering assistant, and held that position until his recent promotion. At the same time, Mr. Mouring has been attending evening sessions at Johns Hopkins University, and has completed three years of study toward a B.S. degree in civil engineering, and is continuing to complete the requirements for this degree.

Rush A. Kelso, whose promotion to assistant division engineer of the Atlanta division of the Southern at Atlanta, Ga., was noted in the March issue, was born at Brownsville, Tenn., on November 12, 1913. He graduated in civil engineering from the University of Tennessee in 1937. His service with the Southern began on August 1, 1942,

(Continued on page 484)

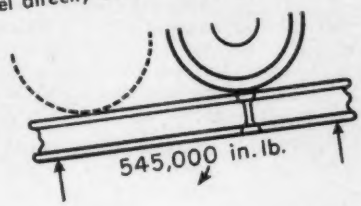
How Strong is a Weld in "Ribbonrail"?



That's a fair question and here is the answer—the results of official A.R.E.A. rolling-load tests on two welded rails.

TEST No. 1

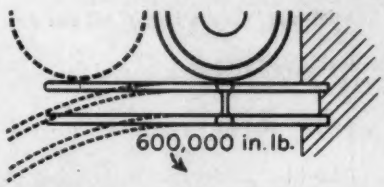
Type: Test of the rail base in tension under a bending moment of 545,000 in.-lb. with the wheel directly over the weld:



Result: "Specimen ran for 2,000,000 cycles of the machine without failure.---This test indicates that the welded rail was superior to the bolted joints."*

TEST No. 2

Type: Cantilever test of the weld with railhead under 600,000 in.-lb. bending moment:



Result: "The specimen developed a fatigue crack directly on the weld line at 1,881,000 cycles. The crack appeared to have started at a ridge on the gage corner which remained from rough grinding of the weld. In service the gage corner would have been worn smooth by the flanges of the car wheels which would be of benefit to the weld. This test can be considered very satisfactory for a welded rail joint."*

Conclusions:

Test No. 1. "This test indicates that welded rails were superior in fatigue properties to bolted rail joints."*

Test No. 2. "Physical test of specimens with the weld at their midlength gave test values nearly as high as unwelded rails."*

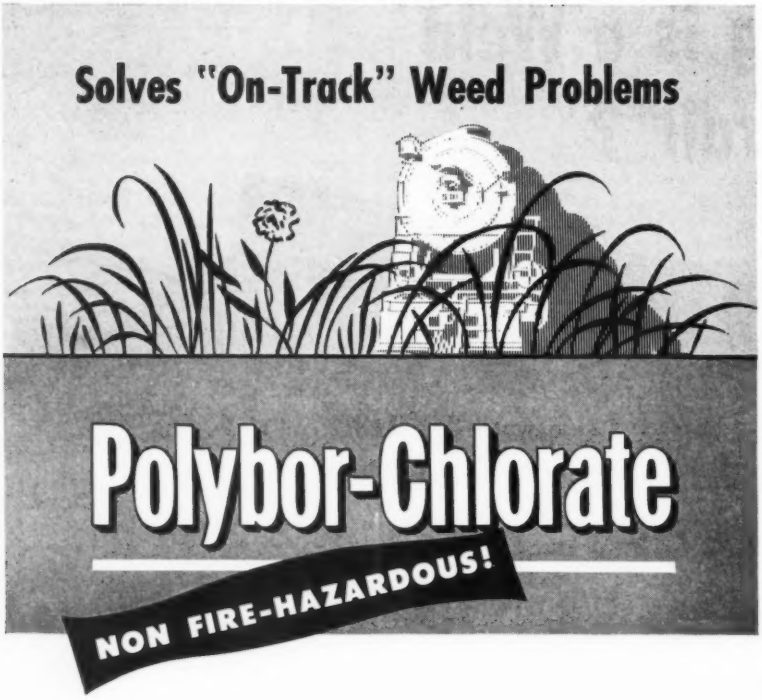
If you would like to see the complete published report of these tests write to OXWELD.

*Actual text from "Proceedings of A.R.E.A., Vol. 50, Pages 510-12."

THE OXWELD RAILROAD SERVICE COMPANY
Unit of Union Carbide and Carbon Corporation
UCC
Carbide and Carbon Building Chicago and New York
In Canada:
Canadian Railroad Service Company, Limited, Toronto

OXWELD RAILROAD SERVICE

SINCE 1912 THE COMPLETE OXY-ACETYLENE SERVICE FOR AMERICAN RAILROADS



It's the "Green Light" all the way when Polybor-Chlorate is used for road-bed and right-of-way weed problems! Save precious man-hours . . . meet the challenge of the 40-hour week by using this chemical to destroy weeds and grasses. Polybor-Chlorate, the safe, non-flammable chemical kills not only the "easy-to-control" vegetation but also destroys most weeds and grasses which are resistant to some other chemicals. Results on road-beds and right-of-ways are truly amazing! Investigate! We'll be glad to demonstrate P-C on *YOUR* line under *YOUR* conditions . . . without charge or obligation, of course.

●

Weed Control Dept. Representatives located in the following cities: CHICAGO • NEW YORK CITY • SEATTLE • PORTLAND, ORE. • CLEVELAND, OHIO • AUBURN, ALA. • MANHATTAN, KAN. • HOUSTON, TEX. • DALLAS, TEX. SIOUX CITY, IOWA • BOZEMAN, MONT. • MINNEAPOLIS, MINN. • LOS ANGELES • SAN FRANCISCO

PACIFIC COAST BORAX CO.
DIVISION OF BORAX CONSOLIDATED, LIMITED
510 WEST SIXTH STREET • LOS ANGELES 14, CALIFORNIA

Railway Personnel (Cont'd)

when he became student apprentice at Corinth, Miss. He was promoted to assistant track supervisor at Dalton, Ga., on February 1, 1943, and was advanced to track supervisor exactly a year later, serving at Cochran, Ga., and at Sheffield, Ala. On September 1, 1948, Mr. Kelso was appointed bridge and building supervisor at Valdosta, Ga., remaning there until November 1, 1949, when he was transferred in the same capacity to the Atlanta division. He held the latter position until his recent promotion.

George H. Echols, whose promotion to chief engineer maintenance of way and structures of the Central lines of the Southern at Knoxville, Tenn., was noted in the February issue, was born at Milledgeville, Ga., on June 17, 1901, and entered the service of the Southern in May, 1924, as a junior engineer at Macon, Ga., serving there later as assistant engineer. In July, 1926, he was promoted to assistant track supervisor at Rome, Ga., and was advanced to track supervisor at Jacksonville, Fla., in February, 1930. He was promoted to assistant roadmaster at Atlanta in March, 1935, and advanced to assistant division engineer of the Atlanta division on January 16, 1946. Later that year he was promoted to division engineer at Atlanta, the position he held at the time of his recent appointment.

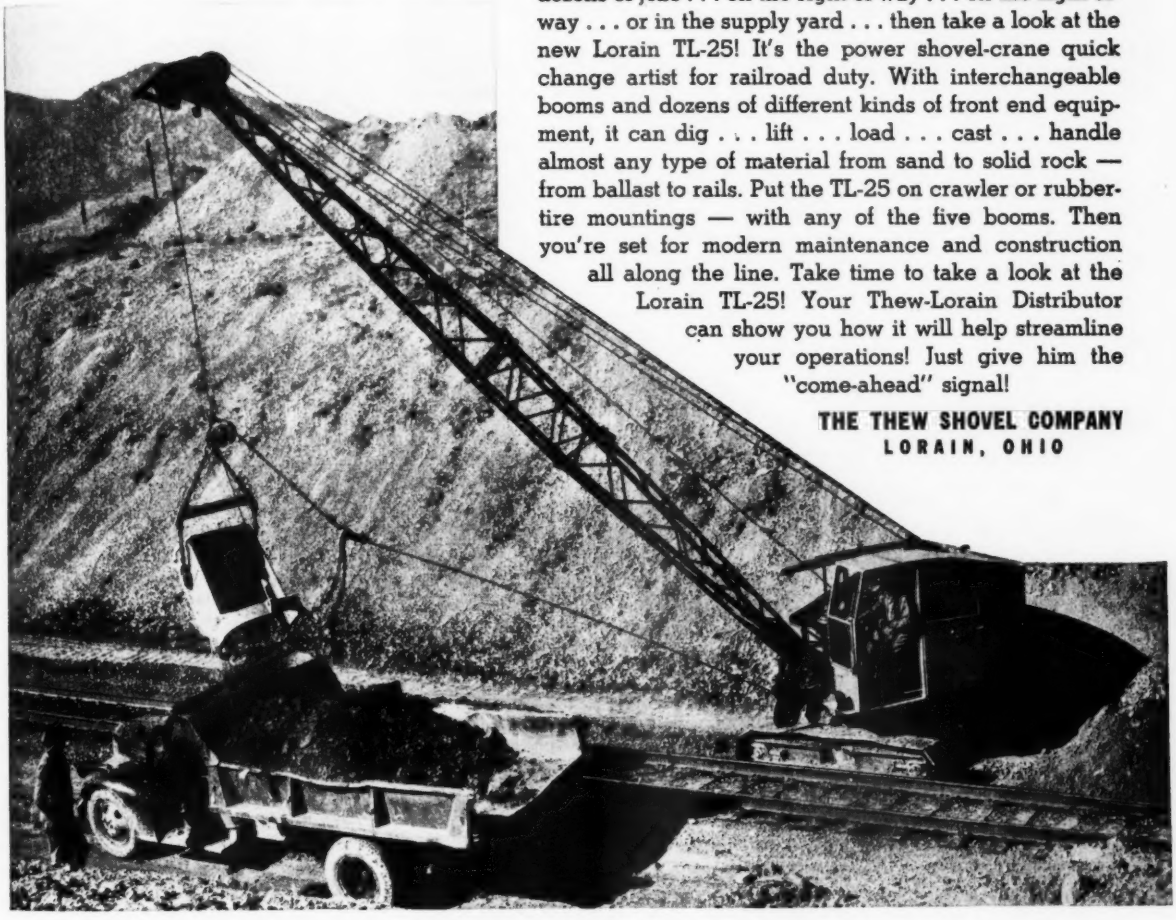
Eugene T. Fitzgerald, whose promotion to division engineer of the Atlanta division of the Southern, at Atlanta, Ga., was noted in the February issue, was born at Fredonia, N. Y., on November 11, 1909, and was educated at Tri-State College of Engineering, where he received a B.S. degree in civil engineering in 1932. He entered the service of the Southern on December 16, 1936, as a rodman at Knoxville, Tenn., and subsequently served as student apprentice and assistant supervisor of track at Dalton, Ga. He was transferred in the latter capacity to Knoxville in May, 1940, and was promoted to supervisor at Valdosta, Ga., in May, 1941. Mr. Fitzgerald was advanced to assistant division engineer of the Atlanta division in June, 1948.

(Please turn to page 486)

STREAMLINE YOUR MAINLINE WITH THE NEW LORAIN Thew TL 25 Lorain

If you are looking for a versatile tool . . . one that handles dozens of jobs . . . on the right-of-way . . . off the right-of-way . . . or in the supply yard . . . then take a look at the new Lorain TL-25! It's the power shovel-crane quick change artist for railroad duty. With interchangeable booms and dozens of different kinds of front end equipment, it can dig . . . lift . . . load . . . cast . . . handle almost any type of material from sand to solid rock — from ballast to rails. Put the TL-25 on crawler or rubber-tire mountings — with any of the five booms. Then you're set for modern maintenance and construction all along the line. Take time to take a look at the Lorain TL-25! Your Thew-Lorain Distributor can show you how it will help streamline your operations! Just give him the "come-ahead" signal!

THE THEW SHOVEL COMPANY
LORAIN, OHIO



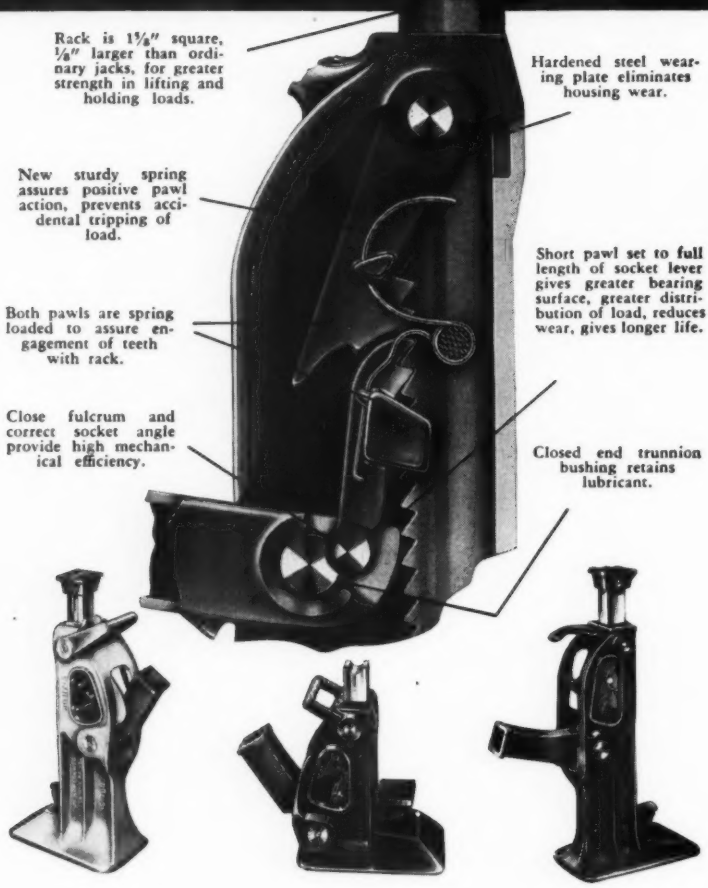
PUT THESE NEW "TL" FEATURES TO WORK ON YOUR RAILROAD — NOW!

- ***Interchangeable "Packaged" Components*** — each major component can be removed and interchanged as a complete assembly — quick to service.
- ***One-Piece Turntable Bed*** — all-welded, all-steel unit.
- ***A Complete Package*** — all essential accessories included as standard. No extras to buy!
- ***5 Identical Clutches*** — 5 shoe type clutches control all operations — interchangeable working parts.
- ***Oil-Enclosed Cut Gears*** — machine cut gears; all but 2 are fully enclosed and run in lubricant.
- ***Unlimited Selection*** — greatest combination of booms and mountings for this class of machine.

THEW LORAIN®

SHOVELS • CRANES • HOES
DRAGLINES • CLAMSHELLS
ON CRAWLERS OR RUBBER TIRES

Why... DUFF-NORTON JACKS are Best for Track Maintenance


Rack is 1⅛" square, ⅛" larger than ordinary jacks, for greater strength in lifting and holding loads.
Hardened steel wearing plate eliminates housing wear.
New sturdy spring assures positive pawl action, prevents accidental tripping of load.
Short pawl set to full length of socket lever gives greater bearing surface, greater distribution of load, reduces wear, gives longer life.
Both pawls are spring loaded to assure engagement of teeth with rack.
Close fulcrum and correct socket angle provide high mechanical efficiency.
Closed end trunnion bushing retains lubricant.

No. 117-A Aluminum Track Jack

No. 517-B Surfacing Jack

No. 117 Track Jack

Yes . . . the features illustrated and described above are the reasons why Duff-Norton Jacks meet exacting requirements of railroad track maintenance crews. For greatest dependability, safety and economy—always specify Duff-Norton.

Write today for Bulletin AD14-Q.

THE DUFF-NORTON MANUFACTURING CO.

MAIN PLANT and GENERAL OFFICES, PITTSBURGH 30, PA. — CANADIAN PLANT, TORONTO 6, ONT.

"The House that Jacks Built"

Railway Personnel (Cont'd)

Belsur Bristow, who has been appointed principal assistant engineer of the Chicago, Rock Island & Pacific, as reported in the February issue, was born at Frankfort, Ind., on May 22, 1900, and received his B.S. degree in civil engineering from Oklahoma university. He entered railroad service with the Rock Island on November 8, 1922, as a chainman, subsequently being advanced to rodman, masonry inspector, instrumentman, assistant engineer and track supervisor. In October, 1939, he was promoted to roadmaster at Chickasha, Okla., being transferred to Ft. Worth, Tex. on September 15, 1941. A year later he was appointed engineer, with headquarters at Houston, Tex. Mr. Bristow was promoted to division engineer at Houston on February 1, 1946, and engineer maintenance of way at Chicago on August 16, 1948, serving in that capacity until his recent appointment as principal assistant engineer.

F. W. Madison, whose appointment as assistant bridge engineer of the Chicago, Rock Island & Pacific, with headquarters at Chicago, was noted in the February issue, was born at Clifton, Ill., on July 2, 1901, and received a B.S. degree in structural engineering from the University of Illinois in 1926. He began his railroad career with the Rock Island on July 15, 1926, as a rodman, and in April, 1927, he was appointed draftsman in the bridge engineer's office at Chicago. In July, 1929, he was appointed bridge inspector, and subsequently served as resident engineer, general bridge inspector and master carpenter until November, 1941. After serving on a new line construction project, Mr. Madison was appointed district bridge supervisor at Des Moines, Iowa, in January, 1946. In August, 1948, he was advanced to division engineer.

E. D. Billmeyer, whose promotion to assistant division engineer of the Western Maryland at Cumberland, Md., was announced in the February issue, was born at Cumberland on February 21, 1907, and was educated at Tri-State College of Engineering, from which he received a B.S. degree in civil engineering in 1928 and a C.E. degree in 1945. He entered railway service in August, 1928, as a levelman on the Pittsburgh & West Virginia, later becoming draftsman and assistant engineer. He left railway work in 1931 to engage in highway and building construction, but in January, 1937, he entered the service of the Western Maryland as assistant engineer, later becoming resident engineer at Hagerstown. Since then he has served at Baltimore and Cumberland as chief draftsman, office engineer and assistant engineer.

Track

E. S. Foster, instrumentman on the Canadian National, has been appointed roadmaster at McBride, B. C.

J. D. Hollifield has been appointed track supervisor on the Chicago & Eastern Illinois, with headquarters at Danville, Ill., succeeding **O. D. Tucker,** who has been transferred to Chicago Heights, Ill. Mr. Tucker replaces **A. M. Loveless,** who has retired after 43 years of service.

C. E. Turpen, section foreman on the Atchison, Topeka & Santa Fe, with headquarters at Kinsley, Kan., has been promoted to track supervisor, with the same headquarters, succeeding **J. W. Cheney. E. H. Weiszbrod,** section foreman, has been promoted to assistant roadmaster, with headquarters at Amarillo, Tex.

Starke P. Critz, supervisor of bridges and buildings on the Illinois Central, with headquarters at Jackson, Miss., has been appointed supervisor of track, with headquarters at McComb, Miss., succeeding **Newell R. Forbes,** who has been transferred to Corinth, Miss. Mr. Forbes succeeds **John E. Rogan,** whose promotion to division engineer is announced elsewhere in this issue.

Bridge and Building

Roy E. Addington, general foreman of bridges and buildings on the Illinois Central, with headquarters at Paducah, Ky., has been promoted to supervisor of bridges and buildings, with headquarters at Jackson, Miss. He succeeds **Starke P. Critz,** whose appointment as supervisor of track is announced elsewhere in this issue.

P. J. Calza, assistant engineer on the Panhandle division of the Chicago, Rock Island & Pacific, with headquarters at Liberal, Kan., has been appointed master carpenter at that location, succeeding **R. B. Stone,** who has been transferred to the Rock Island division at Rock Island, Ill. Mr. Stone succeeds **R. H. Bobst,** who has been assigned to other duties.

Special

H. Mayer, supervisor of scales and work equipment on the Chicago & North Western, has been appointed engineer of scales and work equipment, with headquarters as before at Chicago. Mr. Mayer is succeeded as supervisor of scales and work equipment by **R. W. Bailey,** instrumentman on the Galena Division.

Obituary

G. Brown, retired roadmaster on the Canadian National, died recently at Vancouver, B. C., at the age of 67.

C. J. Carney, division engineer on the Illinois Central, with headquarters at Paducah, Ky., died on March 22, in that city.

(Please turn to page 488)

RUST-OLEUM

RUST-OLEUM is unequalled for lasting protection against the ravages of rust. It's the practical answer to most railroad rust problems because it can be applied to surfaces already rusted without extensive surface preparation. For 25 years — on major railroads — RUST-OLEUM has proved its capacity to stop and prevent costly rust — on bridges, rolling stock, tanks, metal buildings, metal equipment and other structures.

An exclusive formula, RUST-OLEUM adds years of extra use to all metal surfaces. It cuts maintenance costs — indoors and out. RUST-OLEUM'S tough, pliable film dries to a firm finish that defies rain, snow, salt air, fumes, weathering, etc.

Where rust has already started, RUST-OLEUM can be applied effectively and economically. Scraping and wirebrushing to remove rust scale and dirt is all that is usually required. RUST-OLEUM merges the remaining rust into durable, rust-resisting coating that protects the metal against the elements. Use it in all your maintenance work on all exposed metal. Specify it on all new equipment or structures to be sure of maximum results at the lowest cost, with assurance of the best foundation coat.

Get the facts! . . . Write for complete data and recommended applications. Tell us your rust problems.

RUST-OLEUM CORPORATION
2585 Oakton Street • Evanston, Illinois

Association News

American Railway Engineering Association

Because of ill health G. L. Sitton, assistant chief engineer, Southern, has tendered his resignation as president of the A.R.E.A. At a meeting held on April 25, the Board of Directors accepted his resignation and gave consideration to a proposed constitutional amendment to provide for the succession of officers in such instances.

The official opening of the A.A.R. research laboratory on the campus of the Illinois Institute of Technology on the near south side of Chicago is scheduled for May 26. Officers of the A.A.R., the A.R.E.A., city officials and representatives of the collaborating institutions—Illinois Institute of Technology and Purdue University—will participate in the ceremonies.

At the time of going to press, two technical committees have scheduled meetings for May. One of these is the Committee on Iron and Steel Structures, which will meet at Richmond, Va., May 2-3. The other is the Rail Committee, which will meet at Chicago, May 16.

Metropolitan Maintenance of Way Club

E. F. Shelley, track supervisor on the Central Railroad of New Jersey at Jersey City, N. J., was elected president of the club at the annual meeting held at the Hotel Shelburne, New York, on April 27. Mr. Shelley succeeds J. B. Bell, engineer of track, New York, New Haven & Hartford, New Haven, Conn. E. L. Wilson, supervisor of track on the New York Central at Weehawken, N. J., was advanced from second vice-president to vice-president, and J. A. Pollard, roadmaster on the Delaware, Lackawanna & Western, at Hoboken, N. J., was elected second vice-president. Walter L. Turner, Jr., eastern editor of **Railway Engineering and Maintenance**, was re-elected secretary-treasurer.

Prior to the election of officers, T. E. MacMannis, engineer maintenance of way of the Jersey Central Lines, addressed the meeting on Opportunities for Improving Maintenance of Way Operations, in which he stressed the need for greater cooperation and co-

PROVEN WEED KILLERS *plus*
EXPERIENCED SERVICE

CHIPMAN CHEMICAL COMPANY, INC.
Chicago, Ill. • BOUND BROOK, N. J. • Houston, Texas
N. Kansas City, Mo. • Palo Alto, Cal. • Portland, Ore.
Railroad Weed Control Service Since 1912

A COMPLETE LINE OF WEED KILLING CHEMICALS

Meetings and Conventions

American Railway Bridge and Building Association—Annual meeting, September 18-20, 1950, Hotel Stevens, Chicago. Elise LaChance, Secretary, 431 S. Dearborn Street, Chicago 5.

American Railway Engineering Association—Annual Meeting, March 13-15, 1951, Chicago. Neal D. Howard, Secretary, 59 E. Van Buren street, Chicago 5.

American Wood-Preservers' Association—H. L. Dawson, Secretary-treasurer, 839 Seventeenth Street, N. W., Washington 6, D. C.

Bridge and Building Supply Men's Association—E. C. Gunther, Secretary, 122 S. Michigan Avenue, Chicago 3.

Maintenance of Way Club of Chicago—E. C. Patterson, Secretary-treasurer, Room 1512, 400 W. Madison street, Chicago 6.

Metropolitan Maintenance of Way Club—Walter L. Turner, Jr., Secretary, 30 Church street, New York.

National Railway Appliance Association—R. B. Fisher, Secretary; Lewis Thomas, assistant, Secretary 59 E. Van Buren street, Chicago 5.

Railway Tie Association—Annual meeting, August 28-30, 1950, Brown Hotel, Louisville, Ky., Roy M. Edmonds, Secretary-treasurer, 610 Shell Building, St. Louis 3, Mo.

Roadmasters' and Maintenance of Way Association of America—Annual meeting, September 18-20, 1950, Hotel Stevens, Chicago. Elise LaChance, Secretary, 431 S. Dearborn street, Chicago 5.

Track Supply Association—Lewis Thomas, Secretary, 59 E. Van Buren street, Chicago, 5.

ordination between the various subdepartments comprising the M/W group and pointed out other ways in which work could be improved. Preliminary plans were announced for the annual outing, to be held at the Out o' Bounds Aero and Golf Club, Suffern, N. Y., on Thursday, June 15.

Track Supply Association; B. & B. Supply Men's Association

Further progress has been made in arranging the joint exhibit that is to be held by these associations at Chicago in September during the concurrent conventions of the Roadmasters' Association and the American Railway Bridge and Building Association. At the time of going to press a total of 104 companies had arranged to occupy 233 booths at the exhibit. This means that approximately 90 per cent of the available space has already been assigned. It is interesting to note that 22 of the firms that have signed up for space have never before exhibited during the joint exhibitions in September, and among these are a number of firms that have never before participated in any exhibit of railway supply companies.

Additional supply companies interested in participating in the exhibit should address their request for information to Lewis Thomas, Director of Exhibits, 59 E. Van Buren Street, Chicago.

Maintenance of Way Club of Chicago

The annual meeting of the club was held on the evening of April 24 at Eitel's restaurant in the Field Building, beginning with dinner at 6:30 p.m., and with 123 members and guests in attendance. The speaker was Henry H. Talboys, vice-president in charge of the Railway Equipment Division, Nordberg Manufacturing Company, whose subject was: "Your Tax Burden and Your Railroad's Tax Burden."

In the election of officers for the ensuing year, V. V. Holmberg, engineer maintenance of way, Chicago & Western Indiana—Belt Railway, and first vice-pesident of the club, was advanced to president; T. A. Blair, chief engineer system, Atchison, Topeka & Santa Fe, and second vice-president, was advanced to first vice-president; Frederick A. Hess, division engineer, Indiana Harbor Belt, and a director, was elected second vice-president; M. H. Dick, editor, **Railway Engineering and Maintenance,** was elected executive secretary; and E. C. Patterson, assistant chief clerk, Chicago & North Western, was re-elected secretary-treasurer. In addition, the following were elected directors: H. B. Christianson, principal assistant engineer system, Chicago, Milwaukee, St. Paul & Pacific; P. J. Harnish, supervisor of track, Pennsylvania; and Hugh Hazelton, Jr., representative, Ramapo-Aiax Division American Brake Shoe Company.

(Please turn to page 490)

looking for Lower Costs and *faster* Track Jacking?

TRY THESE NEW
Light-Weight
Simplex
—Aluminum Alloy—
TRACK JACKS

Engineered to meet maintenance-of-way demands for fast moving, safe, easy-to-operate equipment, these new Simplex Track Jacks can help you pack more jacking into a day's work; with less drain on manpower.

Aluminum alloy housings, reinforced throughout, provide strength equal to that of jacks weighing 40% more! Sturdy horn handles for fast positioning. Large forged (not a welded plate) and machined toe lifts —2½" x 3¼". Both have 15 tons capacity. No. A17 for general duty. No. A5 for surfacing, lining (up to 2"), tie plate renewal, in conjunction with welded rail and with tamping and ballasting machines.

Simplex LEVER • SCREW • HYDRAULIC Jacks

SEND FOR BULLETIN: TRACK 50

TEMPLETON, KENLY and Company

1026 South Central Avenue • Chicago 44, Illinois

Supply Trade News

General

The **Achuff Railway Supply Company** has announced that its home office will hereafter be located at its Tie Saver plant, 5627 Manchester Avenue, St. Louis 10, Missouri.

The **Davey Tree Expert Company**, Kent, Ohio, has expanded its chemical brush and weed-control division and now offers facilities for the destruction of detrimental weeds and woody growths in industrial plant areas, along highways and along railroad rights-of-way.

Personal

Franklin E. McGee has been appointed service engineer for **George M. Hogan & Co.**, with headquarters at Chicago. He succeeds **Joseph H. Callahan** who has resigned to become sales engineer in charge of railroad sales for the **Industrial Engine & Parts Co.**, Chicago.

James W. Eaton has been appointed sales engineer of **Sperry Rail Service**, division of Sperry Products, Inc., according to L. F. A. Mitchell, sales manager. Mr. Eaton has been assigned to the Chicago office, 80 East Jackson boulevard. He is a graduate of the University of Illinois and was formerly sales engineer for the Chicago Pneumatic Tool Company.

Col. N. A. Powell, recently appointed consultant, railroad sales, of **Armco Drainage & Metal Products, Inc.**, at St. Louis, Mo., as announced in the April issue, has been in sales work with

Col. N. A. Powell

Armco for the past 25 years, the first 15 of which were spent at St. Louis. Prior to that time he served in the engineering department of the Pennsylvania, Western region.

W. P. Lipscomb, whose promotion to railroad sales manager for the Southwestern divison of **Armco Drainage & Metal Products, Inc.**, with headquarters at Houston, Tex., was announced in

W. P. Lipscomb

the April issue, joined the Armco organization in 1936, and since that time he has served in railroad sales work in the southeast and southwest.

J. R. Hursh, whose promotion to railroad sales manager of the Eastern division of **Armco Drainage & Metal Products**, Inc., with headquarters at Baltimore, Md., was announced in the April issue, joined the Drainage Engineering division of Armco in 1940. Following three years in the navy as

gets high UTILITY and MOBILITY rating from Chicago, South Shore & South Bend

It happened all in one day. On a rail-laying job, MICHIGAN set in as many rails as the gang could lay, gage and fasten. Then it travelled five miles to unload a car of cinders.

Result? MICHIGAN'S exceptional mobility increased productive time of crane and operator . . . released a steel gondola for revenue service . . . reduced per diem payments on a foreign car!

And this is not unusual for a MICHIGAN. Its truck mobility is proved daily . . . unloading material at a storage point . . . handling wheels at the car shop . . . then dashing off to do all types of work on the 78-mile electric line with complete satisfaction!

What MICHIGAN is doing for the Chicago, South Shore & South Bend, it can do for you. And fast mobility is only one of the many "extras" you get in a MICHIGAN. There are many more! Learn why MICHIGAN gives you more dollar for dollar . . . write, wire or phone today.

MICHIGAN POWER SHOVEL COMPANY

400 Second Street, Benton Harbor, Michigan, U.S.A.

J. R. Hursh

an officer in the Sea Bees, Mr. Hursh has been sales engineer for Armco, in the Pittsburgh district.

O. O. Lewis, sales manager of **Fairbanks Morse & Co.** at Chicago, has been elected vice-president in charge of

O. O. Lewis

sales. Elected vice-president in charge of purchases and traffic is **F. J. Heaslip**, formerly director of purchases. Mr. Lewis joined Fairbanks, Morse in 1908 as a clerk, and subsequently served for a number of years as sales engineer in Indiana, Ohio and Michigan territories. He was advanced to manager of the Atlanta, Ga., branch in 1932, being transferred to Chicago in December, 1943, as assistant sales manager. He became sales manager in 1948.

Mr. Heaslip joined the company in 1927 as a buyer in the purchasing department. In 1935 he was appointed purchasing agent, being advanced to director of purchase in 1942.

Hiram Hascall, sales manager of **D. W. Onan & Sons, Inc.**, has announced the appointment of **Richard Goff**, as direct factory sale representative in the states of Alabama, Arkansas, Florida, Georgia, Mississippi, South Carolina and Tennessee.

Columbus Basile, shop superintendent of the **Link-Belt Company's** Caldwell plant at Chicago, has been elected vice-president—operations of the **Link-Belt Speeder Corporation** (part of the Link-Belt Company), with headquarters at Cedar Rapids, Iowa.

David E. Davidson, general manager of the **Link-Belt Company's** Pershing Road plant, Chicago, has been elected vice-president—sales, with headquarters at the company's executive offices in that city. **Eugene P. Berg**, assistant general manager at the plant, succeeds Mr. Davidson.

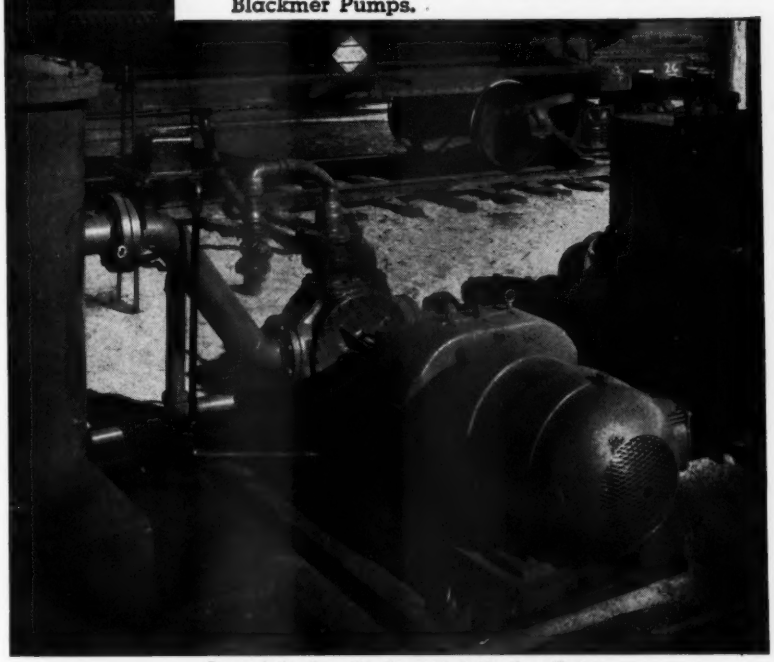
H. H. Howard, director of sales of the **Caterpillar Tractor Company**, has announced the promotion of **Gordon J. Fowler**, district representative in the San Joaquin Valley, Cal., to assistant sales manager, Eastern division, succeeding **Frank S. Foster** who has been appointed assistant sales manager, Western division. Mr. Foster replaces **Truman E. Sage**, who has resigned to join the Northern Commercial Company, Seattle, Wash., which company is the Caterpillar distributor for Alaska.

R. D. Moody, manager of the San Francisco district of the **Allis-Chalmers Manufacturing Company** since July, 1947, has been named manager of the Los Angeles district, succeeding **C. W. Schweers**, who has been appointed manager of the company's New England region, with headquarters at Boston, Mass. **James A. Longely, Jr.**, sales

(Continued on page 492)

BLACKMER WEATHERPROOF PUMPING UNITS PROVIDE DEPENDABLE SERVICE FOR REFUELING DIESELS

In a typical "push-button" Diesel fueling installation a 200 g.p.m. Blackmer Pump refuels a two-unit Diesel locomotive in an average time of about four minutes. Leading railroads, Diesel power plants, bulk petroleum handlers and industrial users cut operating costs with Blackmer Pumps.



Typical Outdoor Blackmer Railside Installation

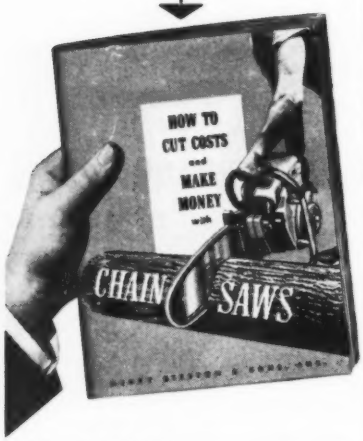
Blackmer Pumps are "self-adjusting" for wear to provide a sustained high efficiency. Should working parts eventually wear out, they may be inexpensively and quickly replaced. Blackmer Pumps are the choice of cost-minded Diesel men because of: 1. Low power consumption. 2. Minimum maintenance. 3. Long service life whether installed indoors or in an exposed outdoor installation.

Write for Bulletin 307, "FACTS ABOUT ROTARY PUMPS."

BLACKMER PUMP COMPANY – GRAND RAPIDS, MICHIGAN

DISSTON® CHAIN SAWS

can save you money



This BIG 36-page Book TELLS YOU HOW

...TO BUY

...TO USE

...TO PROFIT FROM CHAIN SAWS

IT'S FREE!

Send for your copy now. Simply fill in coupon and mail it today.

HENRY DISSTON & SONS, INC.

541 Tacony, Philadelphia 35, Pa., U. S. A.

In Canada, write: 2-20 Fraser Ave., Toronto 3, Ont.

ESTABLISHED 1840

REG. U.S. PAT. OFF.

Henry Disston & Sons, Inc. (Adv. Dept.)
541 Tacony, Philadelphia 35, Pa., U.S.A.

Gentlemen:

I would like very much to have a free copy of your book "How To Cut Costs and Make Money with Chain Saws."

Name _____

Company _____

Street _____

City _____ State _____

My occupation is _____

_____

Supply Trade News (Cont'd)

representative, has been named manager of the San Francisco district to succeed Mr. Moody. **Otho V. Tally,** manager of the St. Louis district, has been appointed manager of the Midwest region, with headquarters at Chicago, succeeding **Benjamin F. Bilsland,** who is retiring on July 1 after more than 30 years of service. Mr. Tally has ben succeeded by **Baldwin G. Witty,** sales representative.

Donald C. Murrin has been appointed sales engineer for **Young & Greenawalt Co.,** East Chicago, Ind., to work principally with railroads. Mr. Murrin is a civil engineering graduate of the University of Illinois and a veteran of three years' service in the Air Forces.

Charles R. Ellicott, Jr., has been appointed eastern district sales manager for the **Duff-Norton Manufacturing Company,** with headquarters at New York. Mr. Ellicott formerly held sales engineering positions with Westinghouse Electric Corporation and Symington-Gould Corporation..

Railroad Supply & Equipment, Inc., Scranton, Pa., has expanded its sales activity to include four new sales engineers at as many locations. **W. B. Walsh,** formerly a sales agent at Chicago, has been appointed a sales engineer for the Chicago territory. The following, who were formerly associated with the Standard Stoker Company, have also been appointed sales engineers: **W. T. Capps,** eastern seaboard territory, with headquarters at Baltimore, Md.; **W. P. Chenault,** St. Louis territory, with headquarters at Memphis, Tenn.; **A. E. Patterson,** Cleveland territory, with headquarters at Cleveland, Ohio; **M. F. Robertson,** southeastern territory, with headquarters at Chattanooga, Tenn., and **E. H. Parr,** northwestern territory, with headquarters at St. Joseph, Mo.

H. R. Condon, a vice-president in the Wood Preserving division of the **Koppers Company** since 1929, has been appointed vice-president and general manager of the division, succeeding **W. F. Munnikhuysen,** who has been appointed executive vice-president of the company. Also **R. R. Holmes,** assistant general manager of the Tar Products division, has been appointed vice-president in that division.

Since assuming his new position, Mr. Condon has made two appointments in the Wood Preserving division. **Walter P. Arnold** has been appointed executive assistant to the vice-president and general manager, and **Frank H. Fischer** assistant general manager. Mr. Arnold will retain responsibility for railroad sales. Mr. Fischer, who has been Pittsburgh district manager for the division, succeeds Mr. Condon as manager of division activities in the eastern half of the country and is succeeded by

Cut Maintenance Costs....

with a Littleford TRAIL-O-ROLLER

This highly portable Littleford Trail-O-Roller is the answer to low cost maintenance of Crossings, Platforms and Parking Areas. Being a one man roller that travels behind a maintenance truck, the labor saving will pay for this unit in no time.

The Trail-O-Roller is small, compact, yet has as much compaction as a 5 ton tandem, in addition it has a Patented Hydraulic Lift for changing it from the Rolling to Trailing or Trailing to Rolling position. It takes only 2 minutes time to change from one position to another. Dozens of rolling jobs can be done in a single day because the Trail-O-Roller goes right along with the maintenance crew. If you want low cost maintenance work, then you want a Littleford Trail-O-Roller on the job.

MAKERS TOP ROAD MAINTENANCE EQUIPMENT SINCE 1900

LITTLEFORD

LITTLEFORD BROS., INC.
471 E. Pearl St., Cincinnati 2, Ohio

John E. Younkin, formerly procurement manager at Marietta, Ohio.

Mr. Condon graduated from Pennsylvania State College with a bachelor of

H. R. Condon

Walter P. Arnold

Frank H. Fischer

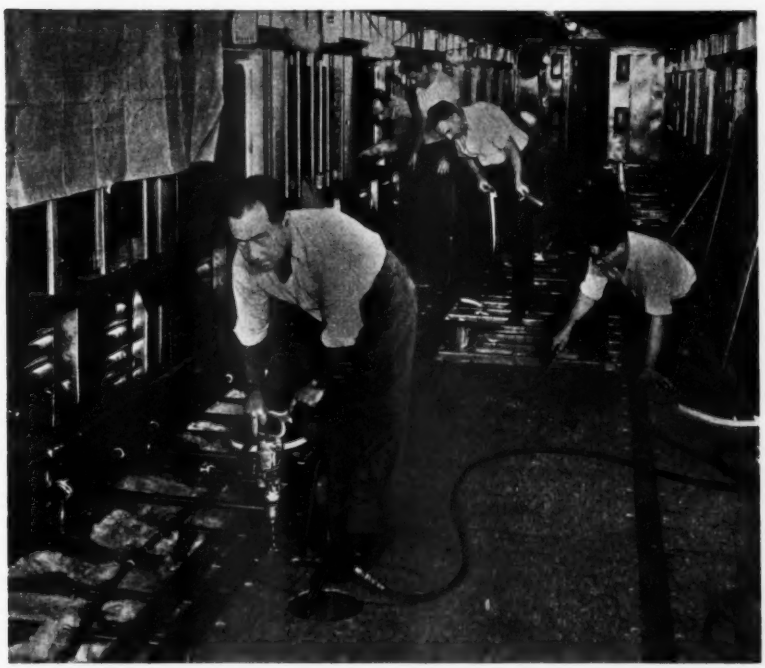
science degree in forestry. Subsequently he joined the Pennsylvania as assistant forester and later advanced to forester. He resigned from that position to join the American Mond Nickel Company as vice-president. In 1929 he accepted a similar position with the Century Wood Preserving Company, later merged with Koppers. Mr. Condon has had responsibility for wood preserving activites of Koppers in the eastern half of the United States since April, 1948, with headquarters at Pittsburgh, Pa.

Mr. Arnold was graduated from the University of Cincinnati with a chemical engineering degree. He joined Koppers as a chemical engineer at its Orville, Ohio, plant in 1925 and ten years later became technical director for the division. He was appointed manager of railroad sales for the division in November, 1946, with headquarters at Pittsburgh.

Mr. Fischer joined a predecessor company of Koppers in 1919, holding positions as purchasing agent and assistant sales manager. When activities of that company were integrated with the Wood Preserving division of Koppers, he was appointed district sales manager for the division. In 1943, he was appointed district manager, with responsibility for sales and production.

R. S. Stevenson, whose appointment as general sales manager of the Tractor division of the **Allis-Chalmers Manufacturing Company** was announced in the April issue, has been associated with Allis-Chalmers since 1933, when he joined the Kansas City branch as a salesman. Two years later he became assistant manager of the company's branch at Omaha, Neb. In 1936 he was transferred to the Milwaukee (Wis.) home office as assistant southwest territory manager, and later that year was appointed manager of the northwest

(Continued on page 494)



PROTECTION...INSTALLED by the SQUARE YARD

CASE HISTORY BUDD CO. Streamliners

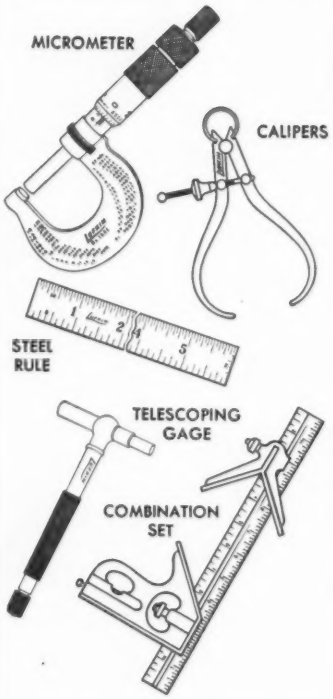
LIGHTNESS, to permit high speeds, and careful manufacture, to keep maintenance costs down, are two major features in the Budd Company's streamlined railway cars. Floor construction is evidence of this. Using plywood (3'x 9' sheets, 25 sheets per car) Budd builds a strong, lightweight, and level undersurface for carpeting or linoleum. To eliminate the problem of decay (a severe one, caused by moisture condensation and trapped water from cleaning operations, especially in diners) Budd specifies all plywood to be pressure-treated with WOLMAN wood preservative salts. WOLMANIZED treated plywood is clean, odorless, and non-corrosive. Approximately three-quarters of a million square feet of WOLMANIZED plywood have been installed in Budd cars during the past two years.

SERVICE RECORDS, whether on railway car lumber or bridge timbers, give the only reliable proof of a wood preservative's value. Service records help develop new uses such as Budd's car flooring. Write to the address below for your copy of "WOLMANIZED" Lumber "Service Records."

American Lumber & Treating Co.
332 South Michigan Avenue • Chicago 4, Illinois

WOLMANIZED PRESSURE TREATED LUMBER

SPEED REPAIRS . . .
CUT "DOWN" TIME with LUFKIN Precision Tools!



Accurate, fast measuring with *Lufkin* superior precision tools can speed up repairs . . . reduce the time equipment is "down" . . . increase maintenance efficiency! Every single *Lufkin* tool, several of which are illustrated above, is well designed, sturdily constructed, carefully finished, critically inspected. First with scores of improvements and features, *Lufkin* precision tools find favor with mechanics everywhere. When you need Precision —Buy *Lufkin*. For complete details, write for a copy of *Lufkin* Precision Tool Catalog #7.

Buy LUFKIN 72-E

TAPES • RULES • PRECISION TOOLS
THE LUFKIN RULE CO.
SAGINAW, MICH. • NEW YORK CITY • BARRIE, ONT.

Supply Trade News (Cont'd)

territory, which includes the northwestern states and western Canada. In 1941, Mr. Stevenson was apponted southwest territory manager and in the fall of 1948

R. S. Stevenson

became assistant general sales manager, the position he held at the time of his appointment to general sales manager.

J. B. Bell, engineer of track on the New York, New Haven & Hartford, has joined the **Pullman-Standard Car Manufacturing Company, Power Ballaster Division,** as sales engineer. Mr. Bell will cover the eastern territory and will have his headquarters in New York.

Trade Publications

(To obtain copies of any of the publications mentioned in this column, use postcards, page 439)

Maintenance of Fire Extinguishers The Ansul Chemical Company is offering a periodic inspection chart designed to help fire inspectors keep records of the fire extinguishers under their jurisdiction. The chart provides space for 26 inspections of up to 38 units.

A Guide for Buyers of Penta Treated Wood—The Dow Chemical Company has issued a three-page set of instructions for buying wood treated with formulations of pentachlorophenol to resist the attack of decay, fungi, wood-destroying insects and dimensional changes due to excess moisture or lack of moisture. The guide covers wood treated by the following processes: (1) pressure treatment; (2) hot-and-cold emersion; (3) Dri-Vac; (4) cold soaking; and (5) dipping.

Timber Panel Grade Crossings—The Wood Preserving Division of Koppers Company, Inc., has published a four-page illustrated folder on Koppers pressure-creosoted timber panel grade crossings. The folder describes the construction of the crossings, lists the various sizes and types available, and presents installation information. It also presents plans and cross sections of typical grade crossings constructed of the timber panels.

LARGE or SMALL . . .

BURRO DOES EVERY JOB EFFICIENTLY, ECONOMICALLY

Whether the Burro is used to speed track laying or relocation, for bridge building, earth or ballast handling or on locomotive coaling jobs, it will handle every job more efficiently and economically—because Burro Cranes are built for railroad work.

Only* BURRO *cranes have:

- *Fast travel speeds—up to 22 M.P.H.*
- *Draw Bar Pull of 7500 lbs. (often eliminates need for work train or locomotive).*
- *Elevated Boom Heels for working over high sided gondolas.*
- *Short tail swing—will not foul adjoining track.*
- *Low overall height—Burro can be loaded and worked on a standard flat car (see illustration).*

Write for Bulletins

CULLEN-FRIESTEDT CO., 1301 S. Kilbourn Ave., Chicago 23, Illinois

CULLEN-FRIESTEDT CO., CHICAGO 23, ILL.

BEFORE - AND - AFTER PHOTOS PROVE THE EFFICIENCY OF JORDAN Spreader-Ditchers

Here is a JORDAN Spreader-Ditcher in action . . . spreading a fill and leveling sub-grade in one operation. Note poor condition of roadbed and the growth of undesirable foliage in the foreground.

Now see the results after the JORDAN has done its job. The fill is spread and sloped gently away from the ballast section . . . vegetation and undesirable foliage completely cleared away.

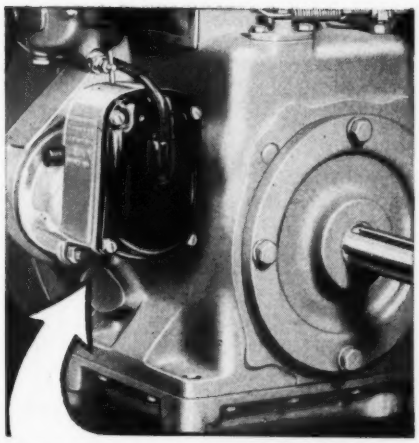
Actual photographs prove the *efficiency* of Jordan Spreader-Ditchers . . . and actual operating cost records prove their *economy*. Add the rugged Snow Plow attachment and, truly, you have a year around *maintenance crew that does the work of an army of men*. That's why the name Jordan has been the answer to roadbed maintenance and snow removal problems for more than 40 years.

Additional information—including typical operating cost data—is available for the asking. Write today.

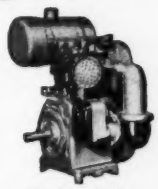
O.F. JORDAN CO.

WALTER J. RILEY, President

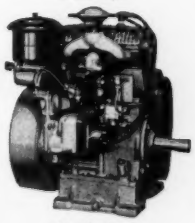
EAST CHICAGO, INDIANA



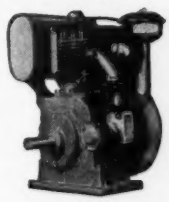
Why WISCONSIN HEAVY-DUTY *Air-Cooled* ENGINES *Have a* Rotary-Type OUTSIDE Magneto



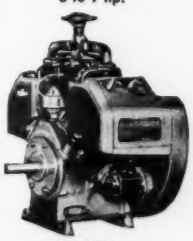
Single cylinder
3 to 6 hp.



2-cylinder,
7 to 13 hp.



Single cylinder
6 to 9 hp.



4-cylinder
V type,
15 to 30 hp.

Wisconsin engineers have found through long experience and experimentation that the best place to put the magneto, not only for convenient accessibility but for better ignition performance over an extended period of time is on the OUTSIDE . . . with an independent, direct drive from the engine to the Magneto. The Rotary Type high tension magnetos used on Wisconsin Air-Cooled Engines provide the greatest protection against ignition troubles because the Magneto itself is a complete, independent operating unit that doesn't rely on an unrelated part of the engine for its successful operation. It's tightly sealed against dust and moisture, of course, so it isn't affected by wet weather and there is no chance of it getting "fouled up". And it's equipped with an Impulse Coupling that provides a quick, hot spark for easy starting in any weather, in any climate — *a feature that can't be incorporated in a flywheel-type magneto.*

Yes, the MAGNETO *is important* . . . both as to type and placing on the engine. It's the right kind and in the right place on Wisconsin Heavy-Duty Air-Cooled Engines.

Highly efficient, dependable AIR-COOLING at all temperatures from sub-zero to tropical highs, plus heavy-duty construction, light weight and compactness are other important advantages that apply to all Wisconsin Engines . . . 4-cycle single cylinder, 2-cylinder and V-type 4-cylinder types and models, 3 to 30 hp.

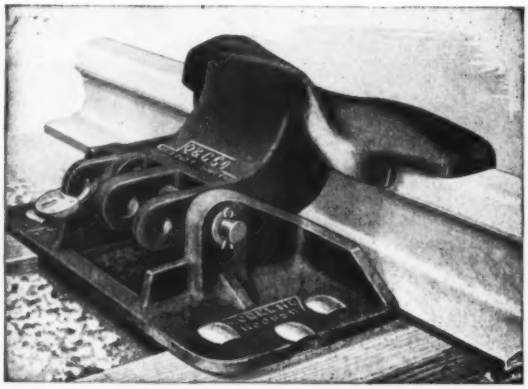
WISCONSIN MOTOR CORPORATION

World's Largest Builders of Heavy-Duty Air-Cooled Engines

MILWAUKEE [illegible]

Protect Main Line Traffic By Using

Q & C Derails



Q and C Hand Throw Derails are of simple design, durable and effective. They may be adjusted in the brackets to fit a range of rail sections eliminating the necessity of carrying many sizes in stock, thus reducing inventories.

We also manufacture Sliding Type and Portable Derails.

Specify Q and C Derails to insure safety and economy

THE Q AND C CO.

Chicago 5 New York 6 St. Louis 1

CLASSIFIED ADVERTISEMENTS

Use this section when seeking a new man, new position, or when buying or selling secondhand equipment.

CLASSIFIED ADVERTISEMENTS . . .

$10.00 an inch, one inch deep by three inches wide, an insertion.

EMPLOYMENT ADVERTISEMENTS . . .

10 Cents a word a month, including address, minimum charge $2.00

Remittance must accompany each order.

Railway Engineering and Maintenance
Classified Advertising Department
79 W. Monroe St., Chicago 3

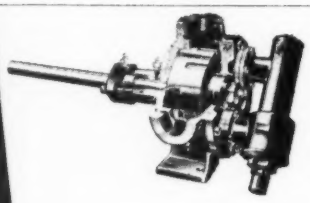
WANTED

Distributors and Sales Agents

Long established concern of operating specialty products used and endorsed by many foremost concerns. Products saleable to all kinds of factories, institutions, steamship, railroad companies and municipalities. Give full particulars. Will be treated confidentially.

Address Box 550,
RAILWAY ENGINEERING & MAINTENANCE
79 West Monroe St., Chicago 3, Ill.

VIKING
FEATURES THAT MAKE FOR GOOD PUMPING



1. **ONLY TWO MOVING PARTS.** Both large and rugged and each self-supported. No small intricate parts requiring frequent replacement

2. **SELF PRIMING** on suction lifts up to 20 feet or vaporization limits on volatile liquids. Smooth, even discharge. No pulsation

3. **SLOW SPEED—LONG LIFE.** Reduced speeds of Viking pumps prolongs life and still retains large volume.

4. **OPERATES IN BOTH DIRECTIONS.** Viking pumps operate equally well in both directions. Simplifies ordering and installation.

5. **SINGLE STUFFING BOX.** Long, leak resistant stuffing box. Easily serviced.

VIKING AN HONORED NAME IN PUMPING

Get the complete story on Viking Pumps for the railway industry today. Send for free copy of Bulletin Series 50SY.

See Our Catalog In SWEETS

Viking PUMP COMPANY
Cedar Falls, Iowa

New Book for Engineers

The First TRANSCONTINENTAL RAILROAD

By J. D. GALLOWAY C.E.

Railroad engineers in particular will find this engineering history of the building of the Union Pacific and Central Pacific fascinating reading. Written by an outstanding consulting engineer of San Francisco and based upon extensive research it is authoritative in treatment. Biographical sketches are given of the great railroad engineers and builders of the period. How the first snow sheds were built, how gorges were spanned with timber bridges, and ten miles of track laid by hand in a day is described with slide-rule precision. Authentic photographs show the work in progress and endpaper maps the original route.

Send for a Copy on Approval

320 pages, 73 photographs, 4 maps, bibliography, index, $5.00

Book Department

Simmons-Boardman Publishing Corp.

30 Church Street New York 7, N. Y.

SEALTITE FASTENERS

Double-Life
SEALED-TITE IN ZINC

All Sealtite products are offered in our thick, double-life, hot dipped galvanized finish. As the name implies, the service life of the bolt is lengthened saving replacement costs and assuring freedom from fastener corrosion. Actual experience tests prove the economy of using Double-Life Sealtite Products.

LEWIS BOLT & NUT CO., 504 Malcolm Ave. S.E., Minneapolis

Designed and Engineered
FOR RAILWAY USE

GIVING YOU MORE
Good Features

The biggest water users of the nation agree that Layne Well Water Systems and Layne Vertical Turbine Pumps have more good features than any other make. They are more rugged in construction, heavier in production—and cost less to operate, giving years and years of service for the original installation cost. There is a size for every need, custom built for any depth setting. For catalogs or more information address

LAYNE & BOWLER, INC.
GENERAL OFFICES
MEMPHIS 8, TENN.

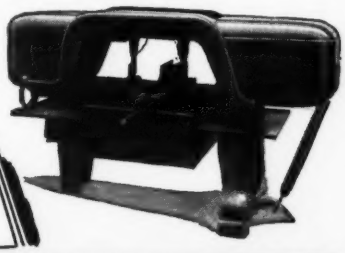
LAYNE
WELL WATER SYSTEMS
VERTICAL TURBINE PUMPS

As an added safety feature, all Model "J"

JOHNSON METAL CUT-OFF BAND SAWS

come equipped with a BLADE GUARD. This guard is located between the Left Frame and Guides. It covers the exposed cutting portion of the blade as a means of protection. The Guard can be readily removed to change blade. Model J (illustrated), heavy, sturdy, cuts 10" rounds, 18" flats.

Also Model B, lighter, portable, rigid. Cuts 5" rounds, 10" flats.



Write for CATALOG!

JOHNSON MANUFACTURING CORP.
ALBION, MICHIGAN

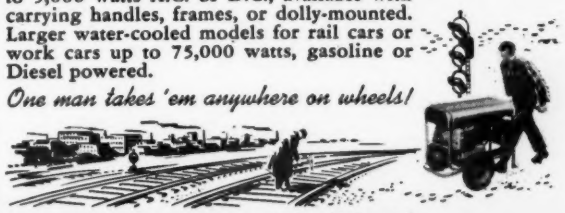
Cut Costs, Speed Work
on Construction and Maintenance Jobs!

with **ONAN** *Portable* **ELECTRIC PLANTS**

5 KW D.C. model with carrying frame.

Take an Onan portable electric plant to every right-of-way maintenance or construction job! It will supply quick "plug-in" electric power for cost-cutting, fast-working electric tools—drills, saws, nut runners, grinders, pipe threaders or any motor-driven equipment. Lightweight models from 400 to 5,000 watts A.C. or D.C., available with carrying handles, frames, or dolly-mounted. Larger water-cooled models for rail cars or work cars up to 75,000 watts, gasoline or Diesel powered.

One man takes 'em anywhere on wheels!



Write for folder showing complete range of A.C. and D.C. models.

D. W. ONAN & SONS INC.
4571 Royalston Ave. • Minneapolis 5, Minn.

Do you know all the answers for

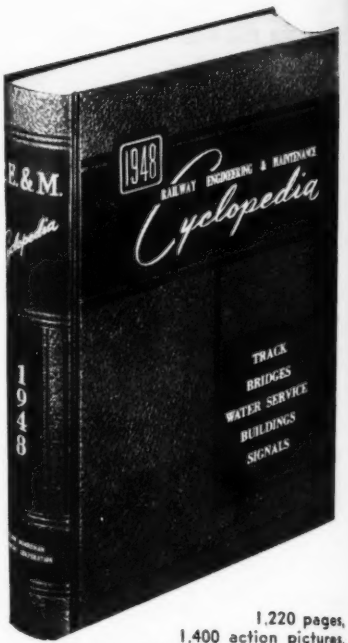
- THE INTENSIFIED SUPERVISION and
- THE GREATER MECHANIZATION

that are essential with the 40-hr. week?

Unquestionably, the 40-hr. week will result in improved operating methods and the adoption of more labor-saving equipment to handle railroad maintenance in a shorter work week. Never before has there been a greater need for the latest edition of the

RAILWAY ENGINEERING & MAINTENANCE CYCLOPEDIA

This volume is packed with factual information on the latest approved maintenance practices and contains descriptions of hundreds of the most recent mechanical equipment, devices and materials used by the railroads. Every man responsible for the construction and maintenance of Track, Signals, Bridges, Buildings and Water Service should have a copy. It is the only reference book of its kind and was prepared by a staff of experienced railway men for railway men.



1,220 pages, 1,400 action pictures, charts and diagrams 9 in. by 12 in., bound in rich maroon Fabrikoid and stamped in gold.

Simmons-Boardman Publishing Corp. REM
79 West Monroe St., Chicago 3, Ill.

Send me a copy of the new Railway Engineering & Maintenance Cyclopedia at the price of $8.00 post paid. I enclose check or money order.

Name .....
Address .....
City ..... Zone ..... State .....
Company .....
Position .....

We have sold more copies of the Seventh Edition than any previous one. We have printed additional copies to take care of the increased demand, but the supply is still quite limited. A book of this kind would ordinarily sell at $25.00 per copy. Get yours now by using the attached coupon at the price of only

$8.00 Post Paid

ALPHABETICAL INDEX TO ADVERTISERS, MAY, 1950

A

Air Reduction Sales Company 432
Allis-Chalmers Tractor Division ... 430-431
Aluminum Company of America 443
American Hoist and Derrick Company 422
American Lumber & Treating Company 493
Armco Drainage & Metal Products, Inc. 410

B

Barco Manufacturing Co. 418
Beall Tool Division, Hubbard & Co. ... 434
Bethlehem Steel Company 407
Blackmer Pump Company 491

C

Caterpillar Tractor Co. 419
Chicago Pneumatic Tool Company ... 438
Chipman Chemical Company, Inc. 488
Cullen-Friestedt Co. 494

D

Dearborn Chemical Company 446
Disston & Sons, Inc., Henry 492
Dow Chemical Company, The 413
Duff-Norton Manufacturing Co., The ... 486

E

Eaton Manufacturing Company 406
Electric Tamper & Equipment Co. 411

F

Fabreeka Products Company, Inc. 441
Fairbanks, Morse & Co. 435
Fairmont Railway Motors, Inc. 444

G

General Railway Signal Company 437

H

Homelite Corporation 420
Hubbard and Company 424-434

I

Industrial Brownhoist Corporation 436
International Harvester Company 433

J

Johnson Manufacturing Corp. 497
Jordan Company, O. F. 495

L

Layne & Bowler, Inc. 497
Lewis Bolt & Nut Co. 497
Littleford Bros., Inc. 492
Lufkin Rule Co. The 494

M

Master Builders Co., The 421
Michigan Power Shovel Company 490

N

National Aluminate Corporation 429
National Lock Washer Company, The ... 499
Nordberg Mfg. Co. 427
Northwest Engineering Co. 409

O

Onan & Sons Inc., D. W. 497
Oxweld Railroad Service Company, The 483

P

Pacific Coast Borax Co. 484
Pittsburgh Plate Glass Company 417
Power Ballaster Division 414-415
Pullman-Standard Car Manufacturing Company 414-415

Q

Q and C Co., The 496

R

Racine Tool and Machine Company 408
Rail Joint Company, Inc., The 405
Rails Company, The 416
Railway Track-work Co. 434
Reade Manufacturing Company, Inc. ... 481
Rinshed-Mason Company 425
Rust-Oleum Corporation 487

S

Schramm, Inc. 426
Simmons-Boardman Publishing Corporation 496-498
Speno Railroad Ballast Cleaning Co., Inc., Frank 428

T

Taylor-Colquitt Co. 479
Templeton, Kenly and Company 489
Texas Company, The 500
Thew Shovel Co., The 465
Timken Roller Bearing Company, The ... 423
True Temper Corporation 412

U

Union Carbide and Carbon Corporation 483

V

Viking Pump Company 496

W

Wisconsin Motor Corporation 495
Woodings Verona Tool Works 475
Woolery Machine Company 477

In addition to the beauty and comfort of travel by rail, there is the great satisfaction of knowing how fine a record of safety our American railroads have.

A relatively inconspicuous but still an important factor on thousands and thousands of miles of well laid track is the protection to rail ends, the absorbing of shocks and stresses, the equalizing of bolt tensions afforded by the use of Improved Hipowers.

IMPROVED HIPOWERS

IMPROVE TRACK

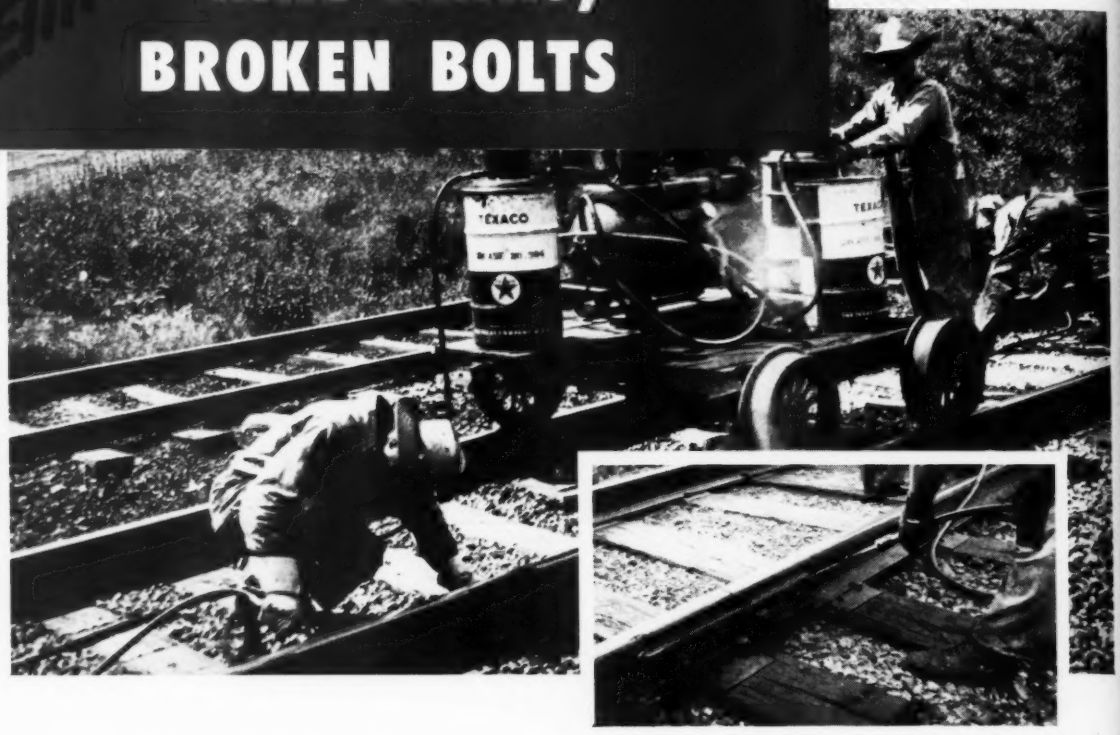
ERIE RAILROAD PHOTO

THE NATIONAL LOCK WASHER COMPANY, NEWARK 5, N. J., U. S. A.

A COMPLETE LINE OF RAILWAY SPRING WASHERS

Eliminate FROZEN JOINTS, RAIL KINKS, BROKEN BOLTS

With simple, power-operated equipment like this, a foreman and five men can apply Texaco Rail Joint Lubrication to between 500 and 600 four-hole joints, or 350 to 400 six-hole joints per day.



Use TEXACO RAIL JOINT LUBRICATION

(Texaco 904 Grease — Texaco Plastic Material "H")

One railroad reports these seven benefits: (1) frozen joints loosed quickly; (2) cold weather pull-aparts eliminated; (3) rail ends, bars and bolts protected against corrosion; (4) bolt breakage reduced; (5) longer joint life; (6) rail creepage reduced; (7) brine and dirt kept out of joint spaces. No wonder Texaco Rail Joint Lubrication reduces maintenance costs.

Texaco Rail Joint Lubrication is quick, easy, low in cost. Simply seal joint ends and bottoms with *Texaco Plastic Material "H"* (a special asphalt sealer) then hand- or power-pump *Texaco 904 Grease* into the joint through an applicator pipe. The job can be done under traffic, without taking the joint down and, properly applied, will last for years.

Let a Texaco representative tell you more about the maintenance-saving possibilities of Texaco Rail Joint Lubrication. He will also gladly explain the Texaco method of asphalt-cement pressure grouting to stabilize "soft track," and the use of Texaco Asphalt for coating stone ballast to improve drainage.

Just call the nearest Railway Sales office listed below, or write:

The Texas Company, *Railway Sales Department*, 135 East 42nd St., New York 17, N. Y.

NEW YORK • CHICAGO • SAN FRANCISCO • ST. PAUL • ST. LOUIS • ATLANTA

TEXACO

TEXACO Rail Joint Lubrication

TUNE IN . . . TEXACO STAR THEATER starring MILTON BERLE on television every Tuesday night. See newspaper for time and station.